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DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, DS, GS AND DEPOT MAINTENANCE MANUAL

VIEWER, STILL PICTURE PS-1 AND PS-1-K

HEADQUARTERS, DEPARTMENT OF THE ARMY

JULY 1968

WARNING

Be careful when working on the 115-volt ac line connections. Serious injury or death may result from contact with these terminals.

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TECHNICAL MANUAL
No. 11–6730–233–15

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D. C., *23 July 1968*

Operator, Organizational, DS, GS, and Depot Maintenance Manual

VIEWER, STILL PICTURE PS–1 AND PS–1–K

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INTRODUCTION

Purpose and Use

Viewer, Still Picture PS-1, PS-1-K (reader) is a fixed magnification 16-mm film reader designed expressly for magazine loading. Together with specially designed magazines, the reader provides for automatic threading and takeup of film. The reader may readily be adapted for interpreting coded images by adding index scales along the bottom and left side of the screen.

The reader is intended only for applications where rapid reference to specific items from a specially prepared film library is desirable. Because the reader application is intended for rapid reference use only, no provision for facsimile reproduction is included in the design. The projected image may be rotated through 270° for proper orientation on the screen.

The film advance and rewind in the reader is motor-driven. The cavity for loading magazines in the reader and controls for the film drive system are located conveniently for the operator's use.

The Recordak Reader Magazine—Model 1 is designed expressly for the Lodestar Reader. For use in the Lodestar Reader, the film must be specially prepared and loaded in the magazine at the processing station. In combination, the magazine and reader provide automatic threading and takeup of film.

Indexes of Publications

DA Pam 310-4. Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms and records in accordance with instructions provided in TM 38-750.

Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700-58 (Army), NAVSUP Publication 378 (Navy), AFR 71-4 (Air Force), and MCO P4610-5 (Marine Corps).

Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38 (Army), NAVSUP Pub 459 (Navy), AFM 75-34 (Air Force), and MCO P4610.19 (Marine Corps).

Forms and Records

Report of Equipment Manual Improvements. Report of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to Commanding General, U. S. Army Electronics Command, ATTN: AMSEL-ME-NMP-AD, Fort Monmouth, N. J., 07703.

Section I. SPECIFICATIONS

A. Film Reader

1. Film Size

Any 16-mm unperforated film loaded in a Recordak Film Reader Magazine—Model 1.

2. Magnification

Approximately 23 diameters. The lens used is a Kodak Projection Ektar luminized lens, 27.58 millimeters, used at f/3.5. Projection Lens Complete Assembly.

3. Film Aperture

The film aperture is .600 x .600 (masked to .550 inch x .550 inch by the screen aperture).

4. Projection Lamp

100 watts, 32 volts, G. E. Special Lamp Schedule #1240, double contact prefocus base.

5. Image Rotation

The projected image can be rotated through 270° on the screen.

6. Screen

Translucent Kodak daylight green tinted screen. Screen size 13 1/2 inches x 13 1/2 inches clear aperture. Screen illumination should be approximately 15 foot-candles at the center and 8 foot-candles in the corners as measured by a Weston Meter having a 2-celled light target and with the reader lamp voltage at 29 volts.

7. Motors

a. 1 lamp cooling fan motor, 1 Film cooling fan motor, and Shaded pole, 115-volt, 60-cycle motors.

b. Takeup Motor. Series, universal wound, 115-volt, 60-cycle motor. It is used to provide tension on the film in the magazine.

c. High Speed Drive Motor. Double field reversible, universal wound ball bearing type motor with single reduction worm gear speed reducer (reduction ratio 4 1/7:1). It is used to drive the film at winding speeds.

d. Low Speed Drive Motor. Double field reversible, universal wound ball bearing type motor with single reduction worm gear speed reducer (reduction ratio 15:1). It is used in conjunction with the silicon controlled rectifier circuit for driving the film at scanning speeds.

8. Film Winding Speeds

Winding speed—100 feet in 9 to 14 seconds.
Scanning speed—variable.
Highest speed—5 to 8 feet per minute.

9. Physical Size and Weight

Height—Approx 25 inches
Width—Approx 16 1/2 inches
Depth—Approx 29 inches
Weight—Approx 80–90 pounds

10. Operating Power

117 volts (plus or minus 10%), 60 cycles, ac only, 300 watts.

11. Differences in Models

The PS–1–K is identical with the PS–1 except it will operate on 50 or 60 cycles ac.

B. Magazine—Model 1

1. Film

Any 16-mm unperforated film may be loaded in the magazine. When the magazines are loaded at the processing station, the following leader and trailer must be mounted to the film with pressure-sensitive tape.

a. Film Leader. 5-inch long, 16-mm, Mylar Film or equivalent with Molded Button (Koppers Dyelene 80 Gray, XM–23033–A).

b. Film Trailer. 10.5-inch long, 16-mm, Red #100 Type D Mylar Film or equivalent.

2. Capacity

Nominally 100 feet of film. Maximum capacity is for 100 feet, plus approximately 4 feet to accommodate leader and trailer.

3. Physical Size

The magazine is made of plastic materials. The case is molded to the following dimensions:

Height—Approx 4 inches.
Width—Approx 4 inches.
Thickness—Approx 1 inch.

Section II. FEATURES

In this section of the manual, the Recordak Lodestar Reader—Model PS-1 will be considered in combination with the Recordak Reader Magazine—Model 1.

A. Magazine Loading

Recessed areas are provided on the Magazine Case (fig. 2, item 1) for applying pressure sensitive index cards or tabs so that the required magazine can quickly be selected. Arrows molded on the surface of the magazine show the position of the magazine for insertion in the reader.

The Reader Magazine Cavity (fig. 1, item 2) is conveniently located for insertion of magazines. Switches are provided in the Magazine Cavity (fig. 3, items 3 and 4) so that the projection lamp is lighted and the reader film drive may be operated only when the magazine is properly positioned in the cavity. An interlock also prevents removal of the magazine when film is threaded in the reader.

B. Automatic Film Threading

When magazine is in place in the cavity of the reader, the Molded Button on the Film Leader (fig. 9, items 7 and 8) is in position to be engaged by the rubber covered Film Drive Roller and spring loaded Pressure Roller (fig. 8, items 9 and 13).

When the film drive is actuated by the operator, initially the pressure roller closes, engaging the end of the film at the magazine between itself and the film drive roller.

Note. Interrelated switches provide that an operator can only cause the drive motor to advance film out of the magazine when the magazine has first been inserted for use. Therefore, the proper direction for moving the control handle becomes experimentally apparent at once without requiring reference to an instruction manual or plate.

As the film drive is continued, the film is guided into the entrance and driven on through the Upper and Lower Film Guides (fig. 5, items 4 and 5). The film guides engage the edges of the film by means of "V" grooves and hold the film in a self-supporting curved path through the reader. A film gate opening (fig. 6, item 10) in the upper and lower film guides is positioned at the optical centerline of the reader.

C. Film Takeup

The driven film is guided through the reader by the film guides until it exits the guides at the top of a Film Chamber (fig. 2, item 2) located within the cabinet. After leaving the film guides, the film threads freely into this chamber whose depth is approximately the same as the film width. By weaving back and forth in the chamber, the film forms self-supporting random coils which maintain the film on edge in the chamber (fig. 2).

D. Operator's Controls

1. Rotate Knob

The Rotate Knob is used to place the projected image in an upright position on the screen. The image may be rotated through 270°.

2. Control Lever

The Control Lever (fig. 1, item 10) selects the film drive speed and direction. The direction the lever is moved from neutral position determines the film drive direction (advance or rewind). The distance the lever is moved determines the film drive speed. When the lever is moved to its extreme position, either side of neutral, the film is driven at a very high rate of speed. The extreme high

speed may be used, especially in conjunction with image coded films, to advance film to the approximate location of a specific item or for rewinding film into the magazine. Slower speeds for scanning purposes may be selected as required.

3. Control Lever Lock

The Control Lever Lock (fig. 1, item 9) may be pulled out to hold the control lever for a preselected film drive speed.

4. Focus Lever

The Focus Lever (fig. 1, item 8) moves the projection lens to properly focus the projected image on the screen.

E. Visual Code Reading

Provision is made for mounting visual code index scales along the bottom and left side of the screen.

F. Film Protection

Film loaded in the magazine is well encased for protection from dust and physical damage. The outside dimensions of the magazine permit 100 magazines to be stored in a single drawer of the regular Recordak film file. Storage of the films in a file of this type with its humidifying provisions is advisable for preserving film.

Section III. INSTALLATION

A. Unpacking Reading

1. Lay the carton (box 1 of 2) on its side and open the top and bottom by slitting the gummed paper fastening tape.

2. Slide the inner carton out and tip it upright as indicated by arrows on the sides.

3. Remove the band from the bottom *ONLY* and lift the hood from the bottom of the carton. The inner liner may or may not come off with the hood. If it does not, remove it at this time.

4. Sever the metal band which holds the wooden frame around the body of the reader. Carefully remove the band and the frame.

5. Remove the polyethylene shipping bag from the reader.

6. Place the reader and its pallet on a table or desk, preferably where it will be eventually located for use. Protect the table and reader cabinet with a cloth or other suitable material and tip the reader so that it rests on the back of its cabinet.

7. Remove the pallet from the reader by removing (4) hex capscrews threaded into the bottom of the cabinet at the corners.

8. Remove the envelope taped to the pallet. This envelope contains—

a. An Operator's Instruction Booklet.

b. A Packing Memo.

9. The smaller carton contains the mirror mounts and bracket assembly and is stencilled "Box 2 of 2". To open this container, slit the gummed paper tape which holds the cover closed. Remove enough of the Kimpac padding so that the assembly may be lifted out of the carton. Unwrap the assembly.

B. Unpacking Disassembled Parts

1. The disassembled parts are packed in 2 cartons attached to the inner liner of box 1 of 2.

a. The larger carton contains the screen and code index scales if scales have been shipped with the reader.

b. The smaller setup box contains:

(1) Lamphouse cover.
(2) Projection lamps.
(1) Prism mount assembly.
(1) Three-wire grounding adapter.
(4) Rubber feet.

2. Remove the *cover* from the smaller setup box by slitting the gummed paper tape which fastens it. Do not remove the box from the inner liner. Remove the disassembled parts.

3. Check the disassembled parts against the parts listed on the packing memo to be sure that all are present.

4. Open the larger screen by slitting the strips of gummed paper which hold the flaps closed.

5. Remove the screen which is suspended in Sus-Wrap.

C. Installation of Parts

1. Install the 4 rubber feet at each corner of the reader base and tip the reader up to its normal upright position.

2. Remove the tape and tissue from the lamphouse. Dust off the reflector and condenser lenses with a soft, lintless cloth. Install one of the projection lamps in the socket in the lamphouse, and place the other projection lamp in the spare lamp clip at the left rear corner of the mechanism plate. See figure 6.

3. Install the lamphouse cover by pressing it onto the lamphouse. Be certain that the cover is pressed onto the lamphouse as far as possible so that it does not cause a shadow on the screen. See figure 5.

4. Install the mirror mounts and bracket assembly. The locating pins will be found in the feet of the Mirrors Mounting Bracket (fig. 12, item 9). The Mirrors Mounting Bracket Screws (fig. 12, item 10) and the Tinnerman Speed Nuts will be found in the

slots of the mechanism plate on either side of the mirror well.

a. Place the assembly in position on the mechanism plate, align the locating pin holes and replace the locating pins.

b. Reassemble the 4 Mirrors Mounting Bracket Screws (fig. 12, item 10), threading them into 2 Tinnerman Speed Nuts which bear against the underside of the mechanism plate. Tighten the screws securely.

5. Unlatch the rear cover stud which is located at the top front of the cabinet and remove the rear cover. Carefully remove the corrugated supports from under the low speed drive motor, the lamp cooling fan motor, and the motor control unit assembly.

6. Install the prism mount assembly as follows:

a. Remove the top Rear Prism Bearing Mounting Screw (fig. 3, item 13) and lockwasher. Loosen the other mounting screw and pivot the Rear Prism Bearing Arm Assembly (fig. 3, item 9) upward and to the right.

b. Remove both Front Prism Bearing Arm Assembly Mounting Screws (fig. 3, item 3) and washers, and take out the Front Prism Bearing Arm Assembly (fig. 3, item 2).

c. Loosen the Prism Rotating Sprocket Bracket Assembly Mounting Screw (fig. 3, item 15), and pivot the bracket assembly as far to the right as possible. If the sprocket teeth are engaged with the Prism Drive Chain (fig. 3, item 5), move the chain so it is looped around the sprocket hub.

d. Clean the exposed optical surfaces of the Prism Mount Assembly (fig. 3, item 4). Loop the chain around the prism mount and engage a convenient link with the roll pin which projects from the mount. Position the prism mount assembly in the cutout section of the mechanism plate so the undercut at the projection lens end engages the tip of the focusing lever and the prism end rests on the Prism Bearing Bracket Assembly (fig. 3, item 10).

e. Place the front prism bearing arm assembly in position on the mechanism plate and reassemble its mounting screws and washers which were removed in *b* above. Adjust the bearing arm on the mechanism plate so it holds the prism mount down on the mechanism plate and engaged with the focusing lever as well as to the left against the vertical support tab. Tighten both bearing arm mounting screws. It is important that this adjustment be made so that the prism mount assembly is held in position and rotates freely.

f. Swing the rear prism bearing arm to the left and down onto the prism mount assembly. Replace the mounting screw and lockwasher previously removed in *a* above. Adjust the bearing arm assembly to hold the prism mount in its bearing bracket. Be certain that this adjustment permits the prism mount to rotate freely. Tighten both mounting screws.

g. Rotate the prism mount assembly so the Prism Adjusting Stud (fig. 3, item 6) is at 9 o'clock position when viewed from the front of the machine.

h. Turn the Prism Rotating Knob (fig. 1, item 1) so the roll pin in the knob is approximately 1/8-inch to the right of the stop pin in the control shaft bearing.

Note. When the rotating knob and prism mount assembly are located as described in *g* and *h* above, the base of the prism will be vertical and to the left of the prism mount axis. It is important that this relationship be maintained in order to minimize the collection of dust on the prism faces and to place vignetting, if any, at the lower left corner of the screen.

i. Without disturbing the position of the prism mount or rotating knob, engage the prism drive chain with the sprocked teeth. Then pivot the prism drive sprocket bracket to the left until the chain is snug but not tight enough to place undue strain on the prism mount assembly or to interfere with smooth rotation of the prism mount or focusing movement.

7. Remove the Sus-Wrap strip and tissue from around the screen. Lower the screen through the top of the cabinet with the dull side toward the front. Tilt the screen so the lower edge is slightly ahead of the top edge while the screen is being lowered and moved forward in the reader cabinet. Position the screen so the top edge is below the upper mounting channel, and slide the screen upwards into the upper channel until the bottom edge can be positioned directly over the lower mounting channel. Lower the screen until the edge bottoms in the lower mounting channel

and the top is held in position by the upper mounting channel. Clean both screen surfaces with Kodak Lens Cleaner and a soft, lintless cloth.

8. Remove the blue plastic protective covering from the name and data plate. This coating peels off easily after being started at one corner with the fingernails.

D. Setting Up

Select a location where the viewing screen will not be subjected to strong, direct, or overhead light. Place the reader on a firm table of convenient height. Be sure the reader is sitting on its four rubber feet to allow adequate air circulation underneath.

The power source required is 117-volt, 60-cycle, alternating current only (50 or 60 cycles for PS–1–K readers). Select a grounded electrical outlet which is well-protected so that the service cord cannot be pulled out or jarred loose accidentally. *Any interruption of the power supply while the reader is in use may result in damage to the film.* If the outlet will not accept the three-pronged plug of the POWER CORD (A, fig. 14), remove the center screw which holds the electrical outlet cover plate to the outlet. Plug the power cord ADAPTER into the outlet. Place the cover-plate screw through the GROUNDING EYELET and rethread into the outlet. Tighten the screw. If the design of the outlet prevents the use of the grounding eyelet, use the GROUND WIRE and TERMINAL to ground the adapter to the electrical outlet. Insert the three-pronged plug of the power cord into the adapter.

E. Operation

Loading the Film

1. Select the desired magazine and make a visual check to be sure the plastic BUTTON (B, fig. 14) does not protrude beyond the edge of the magazine.

2. Hold the magazine in the left hand with the arrows facing up and pointing toward the magazine cavity in the reader, as shown in C, figure 14.

3. Push the magazine into the cavity as far as it will go, and then press down lightly until it seats. A definite click will be heard when the magazine is inserted in the cavity. Seating of the magazine automatically turns on the projection lamp and the blower, making the reader ready for operation.

F. Viewing the Film

The reader film drive is operated by the CONTROL LEVER (fig. 1). Direction of drive is selected by moving the lever to the left (advance) or right (rewind). Speed of drive is increased by the distance the lever is moved from the center or neutral position. Film drive is stopped by releasing the lever and allowing it to return to neutral. *Do not touch the magazine while the film is in motion within the reader.*

To operate the reader for viewing film, proceed as follows:

1. Move the control lever slightly to the left for moderate-speed film advance. As soon as a document image appears on the screen, release the control lever.

2. If the image is not in sharp focus, move the FOCUS LEVER to the left or right until the projected image is sharp. The images will now remain in focus whether the film is stationary or moving.

3. Turn the ROTATE KNOB until the image is in an upright position on the screen.

4. Advance the film until the desired document image is reached; then move the control lever to the left or right as required to center the image on the SCREEN.

Note. When all the film is advanced into the reader, the end of the film is signaled by either a red color or the legend "END—STOP AND REWIND" appearing on the screen and the film motion stopping. When this occurs, *immediately* release the control lever or shift it to the rewind position.

5. If a constant scanning speed is desired, pull out the CONTROL–LEVER LOCK to hold the control lever in the position selected. Push in the control-lever lock to release the control lever. This method is not recommended for finding occasional images on the film. It is used for inspection purposes when all the images are to be viewed at slow scanning speeds.

G. Unloading the Film

1. After viewing the film, move the control lever all the way to the right (high speed "REWIND" position) and hold it there until all the film has been rewound into the magazine. A click will be heard at the completion of rewind. The film will not rewind completely into the magazine unless it is rewound at high speed, and the magazine cannot be removed unless all of the film has been rewound into it.

2. Raise the magazine to the top of the cavity, and withdraw it. Removing the magazine accomplished a three fold purpose. It turns off everything in the reader, prolongs the lamp life, and makes the reader immediately available for the next magazine selected.

H. Magazine Care and Film Splices

To insure proper operation of the reader, follow these precautions concerning magazine care:

1. Magazines that have been in transit should be run all the way into the reader and then rewound before viewing. This will remove any film loops that may have developed during shipment.

2. If, for any reason, the film has been pulled out of the magazine, it must be rewound by inserting the end of a paper clip in the hole in the magazine hub and turning it clockwise, as shown in D, figure 14. *Do not use the point of a pencil.*

3. If magazines are stored in a drawer, they should be kept upright, with the flat sides parallel to the sides of the drawer.

4. Periodically inspect the film leader and the plastic button on each magazine to see that the end of the leader is neither bent nor broken, if it is, the leader must be replaced. Inasmuch as the film is held by the edges as it travels through the reader unit, any splices which change the continuity of the edges may cause film jams and consequent reader malfunction. Make splices only with RECORDAK Microfilm Presstapes used in a RECORDAK PRESSTAPE Microfilm Splicer, Model SA, taking care to see that—

a. All corners of the Presstape adhere to the film.

b. There are no air bubbles or foreign particles under the Presstape when making a splice. If there are, they will reduce the strength and increase the thickness of the joint.

c. The edges of the film at the splice are aligned as illustrated in the SPLICING TIPS on figure 15.

Section IV. CYCLE OF OPERATION

The Lodestar Reader (except for loading with film magazines) is operated completely by electrical components that are subject to control by the operator. This section describes the various reader components with respect to how they function in the reader operation and electrical circuit. Refer to the circuit diagram (fig. 10) for circuit function.

A. Line Cord

The reader requires a *grounded* 115-volt, *60-cycle ac* power supply (50 or 60 cycles for PS–1–K readers). If a three-lead grounded circuit is not available, the Adapter Plug provided should be used and properly grounded to the power supply conduit system. The conduit system should be checked to see that assures a good connection to ground.

As shipped from the factory, the multiple tapped Projection Lamp Transformer primary is connected for 115 volts. If the power supply deviates more than 2 volts above or below 115, see Transformer Adjustment for adjusting the transformer connections.

There is no conventional ON–OFF switch in the reader. The line circuit is closed to the various control circuits of the reader when the line cord is plugged into the power supply. The operator completes the circuits through the operating components by inserting a Film Magazine in the Reader Magazine Cavity and selecting the film drive by means of the Motor Control Switch Lever.

B. Magazine Cavity (Controls)

When the magazine has been fully inserted and lowered into position in the cavity, the Projection Lamp lights, the Lamp Cooling Fan and Film Cooling Fan Motors operate, and the circuits necessary for proper operation of the reader are closed to the Motor Control Switch.

The magazine cavity controls are operated by two switch actuating levers positioned in the cavity so as to be actuated by the magazine as it is placed in operating position. Initially, as it is entered, the magazine actuates the Interlock Solenoid Switch Lever (fig. 3, item 4). When completely inserted and lowered into position for use, the magazine actuates the Magazine Locating Switch Link (item 3). Details of the functions of the 2 actuated switches are described in subsections 1 and 2 below.

1. Interlock Solenoid Switch Actuation

Closes the reader line circuit (1) through the primary of the Projection Lamp Transformer (fig. 7, item 7), (2) to the common terminal of the Magazine Locating Switch (fig. 8, item 4) and (3) to the common terminal of the Film Tab Switch (Item 16) with the following effects:

a. The closed secondary circuit of the projection lamp transformer lights the Projection Lamp (fig. 6, item 4).

b. The normally closed contacts of the unactuated magazine locating switch closes the line circuit through the Interlock Solenoid (fig. 8, item 5). (Note that this solenoid circuit, circuit 21 on the circuit diagram, is also common to a normally open contact of the Film Tab Relay (fig. 4, item 16).) The plunger of the energized interlock solenoid is actuated and, by means of its mechanical linkage, Solenoid Drag Link (fig. 8, item 7) and Interlock Blade Push Rod (item 6), affects operation as follows:

(1) *Solenoid drag link.* Pivots the Pressure Roller Arm (item 12) to separate the Pressure Roller (item 13) from the Drive Roller (item 9) and move the Power Failure Lockout Lever (item 8). The pressure roller and drive roller separation provides clearance so that when the film magazine is fully inserted

in the cavity, the end of the film leader in the magazine may extend beside the drive roller. Located in this position, the film leader will be engaged between the two rollers when the interlock solenoid is later deenergized, and releases the pressure roller to drive film. Moving the lockout lever positions it to mate with a recess provided in the magazine case so that the magazine can be fully inserted in the cavity. The primary function of the lockout lever is to prevent full insertion of a magazine in the cavity if the interlock solenoid is not operating. This prevents damaging or mislocating the end of the film in the magazine by jamming it into the closed pressure and drive rollers (closed if the interlock solenoid is not operating), and also prevents locking a magazine in the cavity, since it could not be removed if the interlock solenoid is not operating. See interlock blade, below.

A secondary function of the lever (since magazine recess and lever must mate for full insertion) is to prevent full insertion of the magazine into the cavity unless the magazine itself is properly oriented. Arrows on the magazine case indicate the correct way to insert the magazine in the cavity.

(2) *Interlock blade push rod.* Raises the Interlock Blade (fig. 3, item 5) and actuates the Film Tab Switch Actuating Lever (fig. 8, item 15). The push rod action of raising the interlock blade when inserting a magazine in the cavity is incidental. The primary function of the interlock blade is to prevent removing a magazine from the cavity after film has been advanced into the reader. After complete insertion of the magazine, when the interlock solenoid is deenergized to advance film, the blade lowers to lock the magazine in the cavity and remains in the locking position until the film has been completely rewound into the magazine. The push rod actuation of the film tab switch actuating lever withdraws the lever from the magazine cavity to provide clearance for the Molded Button (fig. 9, item 8) (tab) on the film leader so that the leader can locate properly beside the drive roller when the magazine is fully inserted and actuates (closes) the film tab switch (See *c* below).

Note. The film tab switch actuating lever is designed and positioned so as to be actuated by either the solenoid interlock blade push rod or the molded button on the film leader (as the button is positioned when the film is rewound into the magazine). Primary function of the actuating lever results from actuation by the molded button to shut off the reader rewind operation and prepare the cavity for removing the magazine when the film is rewound into the magazine.

c. The actuated film tab switch (see above) closes the reader line circuit through the film Tab Relay (fig. 4, item 16). In turn, the contacts of the energized relay affect the reader operation as follows:

(1) Open the rewind circuit to both the High Speed and Low Speed Motors (fig. 7, items 11 and 8) so that the rewind film drive cannot operate (until the interlock solenoid is deenergized by operating the reader film advance system).

(2) Open the Takeup Motor (item 15) circuit so that this motor, which maintains tension on the film in the magazine, cannot operate (until the interlock solenoid is deenergized by operating the reader film advance system).

(3) Close the reader line circuit through the Lamp Cooling and Film Cooling Fan Motors (items 3 and 19) to start the cooling system. Note that this is accomplished through the same circuit that later becomes the interlock solenoid "hold circuit." See step (4) below.

(4) Creates an interlock solenoid "hold circuit" by closing the interlock solenoid circuit (21 on circuit diagram) through the Interlock Solenoid Hold Switch (fig. 7, item 16) to (motor control) circuit 37. Later, when the reader line circuit is closed to circuit 37 and opened to the interlock solenoid by the Magazine Locating Switch the solenoid continues to be energized through this hold circuit. (Note that because the connections are made to the normally open contacts of the hold switch, the switch (S–7) is shown open on the circuit diagram. However, when inserting a magazine in the reader, the switch is actually closed as a result of rewinding the film to remove the magazine previously used.)

(5) It also should be noted that (motor control) circuit 37 constitutes the final circuit required for complete operation of the reader by means of the motor control switch. Since the line circuit is closed *temporarily* to this circuit, by the interlock solenoid "hold circuit," the circuit for starting reader operation (the low speed motor advance circuit) may be operated through the motor control switch. However, film cannot be driven because the interlock solenoid remains energized by the line voltage and continues to hold the pressure roller open. If the low speed motor is energized, as soon as the motor starts to turn in the film advance direction, the interlock solenoid hold switch actuation by the Drag Shoe Retainer (fig. 7, item 13) is released and opens the temporary line circuit connection to (motor control) circuit 37 to stop the motor operation. The circuits are not ready for complete reader operation until the line circuit is closed directly to (motor control) circuit 37. This is accomplished when the magazine is fully inserted and lowered into operating position.

2. Magazine Locating Switch Actuation

When the magazine is lowered into operating position in the cavity, the Magazine Locating Switch (Fig. 8, Item 4) opens the line circuit to the interlock solenoid and closes it to (motor control) circuit 37. Since the line was already closed to circuit 37, this does not change the status of the reader components as described in the preceding section, except that—

a. The circuit (through the film tab relay contacts and interlock solenoid hold switch), which temporarily closed the reader line circuit to (motor control) circuit 37, becomes a holding circuit for the interlock solenoid. Since circuit 37 is now closed directly to line, the interlock solenoid continues to be energized through this holding circuit.

b. (Motor control) circuit 37, which constitutes the final circuit required for complete operation of the reader, is now directly closed to the line circuit so that the circuits for complete reader operation are available, subject to control through the Motor Control Switch.

When the magazine is seated in place in the cavity, the (metal) Magazine Core Disc (fig. 9, item 5) is centered and seats firmly on the Clutch and Magnet Assembly (fig. 3, item 2). The clutch and magnet assembly engages the film core and raises it slightly so that the film (and core) are clear of both the top and lower half of the Magazine Case (fig. 9). This provides that during advance or rewind the film winds freely on the core without interference from the case.

C. Motor Control Switch Assembly

After the magazine is positioned in the reader cavity (section B), complete reader operation is available through the function of the Motor Control Switch Assembly (fig. 5, item 2) which is operated by means of the Motor Control Lever (fig. 1, item 10). This lever actuates the motor control switch and variable reactor, components of the assembly, to select the speed and direction of film drive. Film advance is selected by moving the lever to the left, film rewind by moving the lever to the right. Film drive speed is increased as a function of the distance the lever is moved from its center position.

The motor control switch has twelve blades with normally open contacts. Five blades are used to make and break three circuits for film advance (one blade unused). Six blades are used to make and break four circuits for film rewind. The motor control switch selection of the circuits for high and low speed operation is made in conjunction with the Motor Transfer Relay (fig. 4, item 17). In the low speed selection range of the motor control switch (both advance and rewind) the motor transfer relay coil remains deenergized. The circuits selected for low speed operation are closed through the normally closed contacts of the relay. At the high speed position of the switch (both advance and rewind) the motor control switch closes the line circuit through the coil of the motor transfer relay. The circuits for high speed operation are closed through the normally open contacts of the energized relay.

The function of the motor control switch contacts may be designated as follows:

Advance blade contacts (fig. 10)	Circuit control	Rewind blade contacts (fig. 10)
37	*LINE VOLTAGE*	37
	These (4) contacts are common to one side of the line and serve to close the line to the other switch contacts which, in turn, close the line to the various operating circuits.	
4 and (37)	*LOW SPEED CLUTCH SOLENOID CIRCUIT*	4 and (37)
	These contacts close the line voltage through the primary of the clutch rectifier. The rectifier d.c. output voltage, through the normally closed contacts of the motor transfer relay, energizes the clutch solenoid to link the low speed motor drive to the high speed motor shaft.	
2 and (37)	*LOW SPEED MOTOR CIRCUIT*	6 and (37)
	These contacts close the line voltage, through the normally closed contacts of the motor transfer relay, through the low speed motor for variable low speed film drive.	
Not Used	*HIGH SPEED TAKEUP MOTOR CIRCUIT*	5 and (37)
	This contact bypasses part of the takeup motor resistor to increase the takeup motor speed and torque. This increase is necessary during high speed rewind in order to maintain tension on the film.	
1 and (37)	*HIGH SPEED CIRCUITS*	7 and (37)
	These contacts close the line voltage through the coil of the motor transfer relay. In turn, the energized relay contacts: a. Open the rectifier d.c. output circuit through the clutch solenoid to deenergize the clutch disengaging the low speed motor drive from the high speed motor shaft. b. Open the line voltage (contacts 2–37 or 6–37) through the low speed motor and close it through the high speed motor for fixed high speed film drive. c. Close the rectifier dc output circuit through the clutch capacitor to prepare a clutch solenoid brake circuit.	

Note. The motor control switch circuit to the transfer relay coil for high speed operation must be closed through the Motor Protection Switch (fig. 7, item 17). The motor protection switch is a double throw microswitch in series between the motor transfer relay coil and the motor control switch. One side of the switch is in series with the "advance", the other side in series with the "rewind" motor control switch high speed contacts. The switch is mounted in position to be actuated by the Drag Shoe Retainers (item 13) mounted on, and friction driven by, the high speed motor shaft. When the direction of motor shaft rotation is for *advance* film drive, the retainers release the actuation of the protection switch to close the transfer relay coil to the high speed contacts (37 and 1) on the *advance* side of the motor control switch. When the motor shaft rotation is for *rewind* film drive, the retainers actuate the protection switch to close the transfer relay coil to the high speed contacts (37 and 7) on the *rewind* side of the motor control switch. If the motor control lever is rapidly moved to reverse the direction of high speed film drive, the friction driven retainers do not change the actuation of the protection switch until after the motor shaft rotation reverses. In this circumstance, the relay coil is deenergized and its contacts close the low speed motor circuits which are also closed through the motor control switch. The low speed motor drive takes over momentarily, to start the drive in the newly selected direction. As soon as the low speed drive starts in the new direction, the drag shoe retainers actuate the motor protection switch to close the circuits from the high speed contacts of the motor control switch to the relay coil. The energized relay then opens the low speed circuits and closes the high speed circuits providing high speed film drive. The slight time delay, provided by the motor protection switch, protects the high speed motor from the "flash" of excessive current that would occur if the current for reverse drive was applied directly to the high speed motor.

When the magazine is placed in the cavity to start using the reader, the circuit from the motor control switch to the rewind field of both the low and high speed motors is held open by the film tab relay contacts. This causes the operator to select film advance operation with the motor control lever to start using the reader. Except for the above condition, the type of film drive (advance or rewind, low or high speed) may be selected freely. The following description of the reader operation control by the motor control switch is presented in the sequence that occurs if the control lever is first moved through the advance range of the lever, then through the rewind range.

1. Initially, as the lever is moved to select film advance, switch contacts 37 and 4 close the line circuit through the Clutch Rectifier (fig. 4, item 9). The rectifier d.c. output voltage, through the normally closed contacts of the motor transfer relay, energizes the clutch solenoid engaging the clutch plate and sprocket to link the low speed motor drive to the high speed motor shaft. (Since the film drive roller is mounted on the high speed motor shaft, low speed motor film drive is accomplished through the high speed motor shaft).

2. At the *same time*, or *following slightly*, switch contacts 37 and 2 close the line circuit (through the normally closed contacts of the motor transfer relay) through the advance field of the low speed motor and its control circuit. As the low speed motor starts to turn the high speed motor shaft (clutch solenoid linkage) in the film advance direction, the drag shoe retainers release their actuation of the motor protection switch and interlock hold switch. The released motor protection switch closes the circuit from the motor control switch high speed advance contacts (37 and 1) to the motor transfer relay coil so that high speed advance film drive is available when selected by the motor control switch. The released interlock solenoid hold switch opens the interlock hold circuit deenergizing the interlock solenoid. In turn, the interlock solenoid mechanical linkages, drag link and push rod, are released, affecting reader operation as follows:

a. The interlock solenoid drag link releases the power failure lockout lever and pressure roller. The released lockout lever moves into a notch provided in the lockout lever recess in the magazine. In this position the lockout lever helps to hold the magazine properly positioned in the cavity. The released pressure roller closes engaging the end of the film leader in the magazine against the drive roller. Since the low speed motor is already driving the roller, the film starts to advance into the reader.

b. The interlock blade push rod releases the interlock blade and the film tab switch actuating lever. The released interlock blade lowers against the magazine, locking it in position in the cavity. The released film tab switch actuating lever drops back to extend into the cavity, in position to be actuated by the molded button (tab) on the film leader (when the film is completely rewound into the magazine) and releases its actuation of the film tab switch to open the line circuit through the film tab relay coil.

Note. Depending on the film advance speed, which has already started in the reader, the molded button (tab) may or may not still be in position to intercept the film tab switch actuating lever when it is released by the push rod. In either case, since the film tab switch does not affect film advance operation, the button very quickly moves out from under the actuating lever. For practical purposes, it may be considered that the film tab switch actuation is released by the interlock blade push rod.

The contacts of the deenergized film tab relay close the motor control switch rewind circuit (contacts 37 and 6) so that film rewind operation is available (when selected with the motor control switch lever) and close the line circuit through the Takeup Motor Resistor (fig. 4, item 18) to the Takeup Motor Rectifier (fig. 7, item 23). Through the closed dc secondary circuit of the rectifier, the takeup motor is energized and starts to run in the film rewind direction. The clutch and magnet assembly, mounted on the takeup motor shaft, applies the motor torque (reduced through the takeup motor resistor) to the film core in the magazine (see section B.2.,). The reduced torque of the takeup motor is just sufficient to *maintain tension* on the film wound on the core without unduly influencing the film drive or moving the film when it is stationary for viewing. As soon as film has been advanced into the reader, the takeup motor runs constantly in the rewind direction until the film has been completely rewound into the magazine.

Note. The takeup motor is operated by direct current takeup motor rectifier and capacitor) to eliminate 60 cycle pulse in the motor torque. This was found necessary to prevent the pulse from being transmitted to the film causing projected image vibration.

In this position of the motor control switch the film is advancing at slow speed into the reader. The low speed film advance will vary as a function of the distance the motor control lever is moved from center. As it advances,

the film enters the throat of the Upper and Lower Film Guides (fig. 5, items 4 and 5), travels through the guides past the film Gate (fig. 6, item 10) in the guides to exit freely into and weave back and forth in self-supporting random coils in the Film Chamber (fig. 2).

3. When the motor control lever is moved to select high speed film advance, switch contacts 37 and 1 close the line circuit (through the normally closed contacts of the unactuated motor protection switch, step 2, above) through the motor transfer relay coil. In turn, the contacts of the energized motor transfer relay:

a. Open the clutch rectifier d.c. output circuit through the clutch solenoid. The deenergized clutch solenoid separates the clutch plate and sprocket to disengage the low speed motor drive from the high speed motor shaft.

b. Open the circuit from motor control switch contacts 37 and 2 (line voltage) through the "advance" field of the low speed motor and close it through the "advance" field of the high speed motor. There the relay in effect transfers the film drive from a variable low speed to a fixed high speed.

c. Note that the motor transfer relay contacts in the rectifier output circuit also transfers the clutch rectifier d.c. output to the Clutch Capacitor (fig. 4, item 6). The d.c. rectifier current charges the clutch capacitor to prepare a clutch solenoid brake circuit. This brake circuit is utilized for stopping the high speed film drive quickly. When operating at high speed, if the motor control lever is moved to neutral to stop the film drive, normally there would be considerable high speed motor overtravel causing the film drive to coast to a stop. With the brake circuit in affect, during high speed operation the clutch capacitor becomes charged. When the motor control lever is moved to neutral to stop the high speed film drive, the capacitor discharges through the clutch solenoid. This discharge current energizes the clutch solenoid momentarily to link the low speed motor to the high speed motor shaft. In this circumstance, neutral position of the motor control switch, the low speed motor is not energized and the inertia of the motor acts as a brake to stop the high speed film drive quickly. This provision is especially useful when coded film is being used in the reader.

Note. Discharge Rectifier (fig. 4, Item 4) in the clutch capacitor discharge circuit permits discharge of the capacitor through the clutch solenoid circuit but prevents d.c. current from passing to charge the capacitor during low speed operation.

4. Initial film advance operation to start using the reader closes the circuit from motor control switch rewind contacts 37 and 6 (through the motor transfer relay contacts) to the rewind field of the high and low speed motors (see step 2*b*, above) so that rewind operation is available at any time after the film has been advanced. When the control lever is moved to select rewind operation, initially, contacts 37 and 4 on the rewind side of the motor control switch again close the clutch rectifier circuit to link the low speed motor to the high speed motor shaft as described in step 1 above.

Note. If the change of film drive direction is made at high speeds, the function of the motor protection switch is brought into effect, see note C above.

5. At the *same time* or *following slightly*, rewind contacts 37 and 6 close the line circuit (through the motor transfer relay normally closed contacts) through the rewind field of the low speed motor. As the low speed motor starts to turn the high speed motor shaft (clutch solenoid linkage) in the film rewind direction, the drag shoe retainers actuate the motor protection switch and interlock solenoid hold switch. The actuated motor protection switch closes the circuit from the motor control switch high speed rewind contacts (37 and 7) to the motor transfer relay coil so that high speed rewind film drive is available when selected by the motor control switch. The actuated interlock solenoid hold switch closes the interlock solenoid hold circuit to the normally open contacts of the deenergized film tab relay. This preparation of the hold circuit provides that, when the film is completely rewound in the magazine so that the film button actuates the film tab switch to energize the film tab relay, the energized relay contacts close the hold circuit (line voltage) to the interlock solenoid and through its mechanical linkages prepare the reader cavity for removing the magazine, see step 8.

6. As the motor control lever is moved past the added spring tension on the lever toward the high speed film drive position, just prior to closing high speed rewind contacts (37 and 7), contact 5 is closed (through contact 4) to contact 37. This reduces the resistance in the takeup motor circuit by by-passing part of Takeup Motor Resistor (fig. 4, item 18) to increase the torque and speed of the takeup motor. This torque and speed increase is necessary to maintain tension on the film in the magazine during the high speed film rewind operation.

7. When the control lever is moved to select high speed film rewind, switch contacts 37 and 1 close the line circuit (through the normally open contacts of the actuated motor protection switch, see step 5, above) through the motor transfer relay coil. In turn, the contacts of the energized relay:

a. Disengage the low speed motor drive from the high speed motor shaft as described in step 3*a* above.

b. Transfer the line voltage through the motor control switch contacts 37 and 6 from the rewind field of the low speed motor to the rewind field of the high speed motor for high speed rewind film drive.

c. Close the clutch rectifier d.c. output to the clutch capacitor to prepare the clutch solenoid brake circuit as described in 3*c* above.

8. When the film is completely rewound into the magazine, the molded button (tab) on the film actuates the film tab switch to close the line voltage through the film tab relay coil. The contacts of the energized relay:

a. Open the takeup motor circuit and the motor control switch circuit to the rewind field of the high- and low-speed motor to stop the rewind film drive.

b. Close the interlock solenoid hold circuit to energize solenoid and, by means of its mechanical linkages, separate the pressure roller from the drive roller, move the lockout lever and raise the interlock blade so that the magazine may be removed from the cavity. It may be seen by this that the reader circuits are returned to the same status that exists after a magazine is in place in the reader magazine cavity.

D. Silicon Control Rectifier (SCR)

The variable low speed reader operation is controlled by the silicon controlled rectifier circuit.

Section V. SERVICING

A. Preventive Maintenance

Preventive maintenance is the systematic care, servicing, and inspection of equipment to assure that the equipment is serviceable and to prevent failure during operation.

The preventive maintenance checks and services charts outline functions to be performed daily and monthly. The charts list what to check, how to check, and refer to illustrations, paragraphs, etc, that contain detailed procedures. Record these checks in accordance with TM 38–750.

1. Operator's Daily Preventive Maintenance Checks and Services

Sequence No.	Item to be inspected	Procedure	Reference
1	Completeness	Check to see that equipment is complete.	App. B.
2	Cleanliness	Remove loose dirt and dust from metal and glass surfaces with a dry, lint-free cloth.	
3	Operation	During operation, be alert for any unusual operating conditions. Listen for unusual sounds when loading, advancing, or rewinding film.	Sec. III E, F, G.

2. Organizational Monthly Preventive Maintenance Checks and Services Chart

Sequence No.	Item to be inspected	Procedure	
1	Reflector, projection lamp, and condenser lenses.	Check for cleanliness	
2	Film guides	Check for cleanliness	
3	Projection lens	Check for cleanliness	
4	Mirrors	Check for cleanliness	
5	Screen	Check for cleanliness	
6	Film chamber	Check for cleanliness	
7	Reader	Lubricate as required	

3. Cleaning

a. Reflector, Projection Lamp, Condenser Lenses. Since these parts are located in a covered lamphouse, they should ordinarily require no more than an occasional dusting with a soft, lintless cloth. However, if fingerprints, grease, or other dirt is evident on any of these parts, they are easily removable for a more thorough cleaning with a soft cloth dampened with water or Kodak Lens Cleaner. The parts become accessible with the removal of the Lamphouse Cover, which slides up off the lamphouse. Remove the Projection Lamp first, by pressing downward and turning it counterclockwise to disengage it from its socket. With the fingers of both hands, relieve enough of the tension on the reflector clips so that the Reflector can be rolled up out of the clips without damage and without putting a permanent "set" in the clips. Grasp the left top edge of the Reflector between the thumb and index finger of the right hand and roll the Reflector up out of its clips while relieving the

tension on the right-hand clip with the third or fourth finger of the right hand. The left-hand thumb and index finger are used to relieve the tension on the left-hand clip just enough to allow the Reflector to be rolled out easily. Removal of the Condenser Lenses from their bracket is easier if Upper Film Guide is removed first. The lenses can then be rolled out in a manner similar to that described for the Reflector, except that it is not necessary to relieve the spring tension on the clips.

b. Film Guides. The Upper and Lower Film Guides should be cleaned periodically to prevent any buildup of dirt or other material which might interfere with the movement of film through the guides. Remove the Upper Film Guide from the Lower Film Guide. Loosen the dirt in both guides with a stiff brush, such as a toothbrush, and then remove the dirt by brushing the guides thoroughly with a soft brush. After cleaning the Lower Film Guide and before reassembling the Upper Film Guide, clean the outer surface of the Condenser Lens.

c. Projection Lens. The exposed surfaces of the projection lens in the front end and compensating lens in the back end of the Prism Mount Assembly (fig. 13, item 4) are the only parts of the assembly which require cleaning. The compensating lens surface is easily cleaned and the outer surface of the projection lens becomes accessible with the removal of the upper film guide. Both surfaces may be cleaned with Kodak Lens Cleaning Paper or a soft, lintless cloth moistened with Kodak Lens Cleaner. *DO NOT* remove the prism mount assembly for cleaning purposes or attempt to dismantle the assembly to clean the inner optical components.

d. Mirrors. The mirrors are overcoated, aluminized, front surface mirror. Under normal operating conditions, they should require little more than an occasional dusting with a soft, lintless cloth. A soft cloth dampened with the cleaner recommended by the Recordak Service Department may be used if it is necessary to remove fingerprints, grease, or other dirt.

e. Screen. An occasional dusting of both surfaces with a soft, lintless cloth should be sufficient to keep the Screen in good condition. If a more thorough cleaning is required, use a soft cloth dampened with lukewarm water and mild soap.

f. Film Chamber. Dust, lint, and other foreign material should be cleaned out periodically.

4. Periodic Lubrication

a. Small amount of vaseline on the Power failure Lockout Lever where it slides on the Magazine Cavity.

b. Small amount of vaseline on both ends of Interlock Blade Push Rod where it bears against the Interlock Blade and the Film Tab Switch Lever.

c. One drop of light machine oil at each end of the Interlock Blade Pivot where it supports the Interlock Blade.

d. Lubricate the surfaces of the locating shoulders in the Magazine Cavity with graphite. This can be done by rubbing a soft pencil lead against the vertical surfaces of the locking recesses on a magazine, and transferring the graphite to the locating shoulders by moving the magazine up and down while pulling it against the shoulders.

e. One drop of Sunvis 931 in each nylon bearing in the prism drive sprocket bracket at reassembly.

f. One drop of Sunvis 931 on each of the 3 tape bearing strips on the prism bearing support assembly as required.

g. A light coat of unitemp on the inside of the front control shaft bearing at reassembly.

h. A light coat of Dixon Slip Stick as required on the prism mount where it is in contact with the two surfaces of the mechanism plate.

i. Wax the surface of the Film Chamber (Festoon Chamber) and Film Chamber Cover with a light coat of Simonize Paste Floor Wax.

j. Check Magazine to determine if the film edge is waxed. If no wax is evident, force Simonize Paste Floor Wax through the mesh of a cotton cloth to apply a smooth,

even, moist wax coat to the film edges. Before reassembling the Magazine, make certain that the Guide Roller Pin has been waxed.

B. Troubles and Remedies Index

Index No.	Trouble
	OPTICAL
1	No screen illumination
2	Poor screen illumination
3	Poor screen image definition
	FILM DRIVE
4	No film drive—Mechanical (Drive Motors run)
5	No film drive—Electrical (Drive Motors do not run)
6	Erratic film movement and "jitter"
7	Unsatisfactory film movement control
8	Film jams
	MISCELLANEOUS
10	Magazine can be removed from cavity when there is film in the reader
11	Magazine cannot be removed from cavity after all of the film has been rewound
12	Interlock Solenoid noisy or sluggish
	OPTICAL
13	Uneven image definition on screen
14	Images do not remain centered on the screen as they are rotated
15	Keystoning
16	Images shift erratically on screen when being focused or rotated
	MECHANICAL
18	Rotating limits do not permit complete image rotation
19	Prism rotating knob turns too hard
20	Bind in prism rotating mechanism

Trouble	Probable cause	Parts/assy. involved	Fig.	Remedy
OPTICAL				
(1) No screen illumination	Line Cord not connected	Line Cord Assembly	7	Connect Line Cord to power supply.
	Reader not connected to proper power supply.			Connect to 60 cycle ac power source. An accessory inverter is required for DC operation.
	Lamp burned out	Projection Lamp	6	Replace lamp.
	Defective Projection Lamp Transformer.	Projection Lamp Transformer	7	Check primary and secondary voltage at Projection Lamp Transformer Terminal Strip. Replace Transformer if defective.
		Transformer Terminal Strip	7	
	Defective wiring	Wiring Diagram	--	Check continuity of primary circuit to Projection Lamp Transformer and from the Transformer to the Projection Lamp Socket. Locate and repair defects.
	Defective Interlock Solenoid Switch.	Interlock Solenoid Switch	3	Check operation of switch with magazine to be certain that switch opens and closes circuit to Projection Lamp Transformer. Replace switch if defective.
	Foreign object in optical path		--	Remove object.
(2) Poor screen illumination.	Dirty optics	Reflector	6	Clean as directed.
		Projection Lamp	6	Replace Projection Lens if foreign material can be detected between the lens elements.
		Aspheric Condenser Lens	--	
		Condenser Lens	6	
		Projection Lens	5	
		Mirror	5	
		Screen	1	
	Mirror surface deteriorated	Mirror	--	Replace Mirror.
	Condenser Lenses improperly mounted.	Condenser Lens	6	Aspheric Condenser Lens should be nearer to Projection Lamp and convex surfaces of the lenses should face each other.
		Aspheric Condenser Lens	--	
	Wrong lamp or lamp output reduced because of extended use.	Projection Lamp	6	Check to see that lamp is a 32-volt, Double Contact Prefocus Base, CC6 Filament, 50 hour Special Service Lamp, G.E. Special Lamp Schedule #1240. Replace lamp if necessary.
	Low supply line voltage		--	Check supply line for temporary drop in voltage.

Trouble	Probable cause	Parts/assy. involved	Fig.	Remedy
	Wrong tap being used on primary of Projection Lamp Transformer.	Projection Lamp Transformer Transformer Terminal Strip Transformer Terminal Strip Marker.	7 7 7	Check supply line voltage and connect wire #18 to appropriate terminal.
	Condenser Bracket misaligned	Condenser Bracket, complete	--	Adjust Condenser Bracket until Reflector and Projection Lamp are correctly aligned.
	Foreign object in optical path		--	Remove object.
	Lamphouse Baffle tape mislocated or missing.	Lamphouse Baffle Tape	5	Relocate tape strip correctly or add new tape strip.
	Film Guide Light Baffle loose or missing.	Film Guide Light Baffle	--	Press Baffle firmly in place or install new Baffle.
	Lamphouse Cover not seated properly or missing.	Lamphouse Cover	5	Replace Lamphouse Cover and be certain that it is pressed down onto the Lamphouse as far as possible.
	Rear support tip of the Condenser Bracket resting below the Mechanism Plate.	Condenser Bracket complete	--	Loosen the Illumination Assembly Mounting Screw, pull the Condenser Bracket back and position the rear tip of the bracket so that it rests on the Mechanism Plate, and is located in recess provided in the Lower Film Guide. Readjust the Illumination Assembly.
(3) Poor image definition on screen.	Dirty optics	Reflector Projection Lamp Aspheric Condenser Lens Projection Lens Mirror Screen	6 6 6 5 5 1	Clean as directed.
	Projection Lens not engaged properly with tip of Focusing Lever.	Focusing Lever Projection Lens	5 5	Check the engagement of the Projection Lens with the Focusing Lever. The lens should fit on the lever without being held up away from the Mechanism Plate by burrs or chips on the plate or lever tip. Also, the lever should fit into the recess in the lens barrel freely enough so that movement of the lever will not "cock" the lens.
	Lens shimming tape worn, dislodged, or missing.		--	Shim Projection Lens as required to obtain good top to bottom and side focus on the reader screen.

Trouble	Probable cause	Parts/assy. involved	Fig.	Remedy
	Elements loose in lens barrel	Projection Lens	5	Replace lens.
	Focusing Lever tip bent up away from the Mechanism Plate.	Projection Lens Focusing Lever	5 5	Remove Focusing Lever and straighten.
	Film cooling system not functioning properly.	Large Air Duct Film Cooling Filter Film Cooling Fan Motor Film Cooling Fan and Collar Assembly. Small Air Duct	7 7 7 -- 5	Remove material from around the base of the reader which would hinder air circulation under the reader. Check for obstructions in the Large and Small Air Ducts and for mechanical interference between the fan blades and the filter or baffle. Be certain that the Film Cooling Fan Motor is operating and that the Fan and Collar Assembly is tight on the Motor Shaft. Replace filter, if necessary.
	Dirt in gate area of Film Guides.	Upper Film Guide and Set Screw Assembly. Lower Film Guide	5,6 5,6	Remove Uupper Film Guide and clean both Upper and Lower Film Guides throughly. Loosen dirt by brushing with a stiff brush such as a toothbrush, and then remove the dirt by brushing both guides with a soft brush.
	Film Guides too far apart	Upper Film Guide and Set Screw Assembly. Lower Film Guide Film Guide Springs	5,6 5,6 6	Remove the Upper Film Guide and examine both guides for the presence of dirt or other foreign material which would keep the set screws from correctly locating the Upper Film Guide with respect to the Lower Film Guide. Pay particular attention to the area near the locating pins in the Upper Film Guide and the locating holes in the Lower Film Guide. Check the Film Guide Springs and reform them if necessary. Readjust the setscrews in the Upper Film Guide if necessary.
	Defective Takeup Motor Capacitor.	Takeup Motor Capacitor	7	Remove old capacitor and try a new one.

Trouble	Probable cause	Parts/assy. involved	Fig.	Remedy
	Film plane not perpendicular to optical centerline.	Lower Film Guide	5,6	Remove the Lower Film Guide from the Mechanism Plate. Examine surfaces of the guide which bear on the Mechanism Plate, and remove any dirt, chips, or other material which would tend to keep the guide from resting squarely on the Mechanism Plate in the area which supports the Lower Film Guide and reassemble the guide to the plate. Be certain that all of the Lower Film Guide Mounting Screws are tight after the guide has been adjusted. After tightening the (2) center screws, back off each screw 3 to 5 degrees to relieve the warp transmitted to the guide by the screws.
	Film completely out of Film Guides at gate area.	Upper Film Guide and Set Screws Assembly.	5,6	Check the location of the Film Guides with respect to the Film Chamber. Be certain that the Film Chamber Stop is adjusted correctly and that the Film Chamber is against the Stop. Unless the Film Guides and Film Chamber are properly adjusted, the film may become caught as it is being rewound and will pull out of the Film Gate when it is jerked taut. Pressure on the Film Chamber Cover or a dent may produce the same effect, by restricting film movement. Check the Film Chamber and Film Chamber Cover for any deformity which might hinder film movement. Maladjustment of the Upper Film Guide may also result in the film leaving the gate during either rewind or advance.
		Lower Film Guide	5,6	
		Film Chamber	2	
		Film Chamber Stop	--	
		Film Chamber Cover	1	
	Lens Spring stretched	Projection Lens	5	Install new Spring.
		Lens Barrel Spring	5	
	Film kinked		--	Rewind entire roll of film several times. If this is not satisfactory, remove individual kinks manually.

Trouble	Probable cause	Parts/assy. involved	Fig.	Remedy
	Projection Lens mounted in reverse.	Projection Lens	5	Remove lens and remount it so the end marked "This End Toward Mirror" is so located.
FILM DRIVE				
(4) No film drive Mechanical (Motors run).	Empty magazine	Recordak Film Reader Magazine	1	Replace with a full magazine.
	End of leader deformed	Film Leader	9	Hold the magazine with the arrows up and pointing away. With the magazine in this position, and starting at a point .250" from the end of the leader, the tip of the leader should be offset 0.080" to the left and then straightened again at a point approximately 0.050" from the end of the leader.
	Film Drive Roller loose on shaft.	Film Drive Roller	--	Readjust and tighten Film Drive Roller on its shaft. (See Adjustments).
	Bind in mechanical operation of parts linked to Pressure Roller.	Pressure Roller Arm Pressure Roller Stud Power Failure Lockout Lever	8 8 8	Stone surface of Power Failure Lockout Lever which bear against Cavity Wall. Check for binds between the Pressure Roller Arm and Lower Film Guide and between the Pressure Roller Arm and its Pivot Stud.
	Bind in Pressure Roller Bearing	Pressure Roller Shaft Assembly	8	Replace Pressure Roller Shaft Assembly.
	Insufficient spring tension on Pressure Roller Arm.	Pressure Roller Arm Power Failure Lockout Lever Spring.	8 8	Check the spring for anchorage and distortion. Increase the spring tension by shifting the end of the spring to one of the alternate anchoring holes in the Magazine Cavity. (See Adjustments.)
	Power Failure Lockout Lever bottoming against magazine.	Power Failure Lockout Lever	8	Readjust Power Failure Lockout Lever. (See Adjustments.)
	Worn Film Drive Roller allows Power Failure Lockout Lever to bottom against magazine.	Film Drive Roller	8	Install and adjust a new Film Drive Roller. (See Adjustments.)
	Poor contact between Drive Roller and Pressure Roller.	Film Drive Roller Pressure Roller Arm	8 --	If there is not full contact between the Drive Roller and Pressure Roller, readjust the Pressure Roller Arm.

Trouble	Probable cause	Parts/assv. involved	Fig.	Remedy
		High Speed Motor Mounting Screws.	5	Check the position of the High Speed Drive Motor on its mounting plate. If it has shifted, loosen the front Motor Mounting Screw and relocate the motor on the plate so that there is good contact between the Drive Roller and Pressure Roller. (See Adjustments.)
	Film Drive Roller glazed or dirty from extended use without cleaning.	Film Drive Roller	8	Clean the Drive Roller with a clean cloth dampened in water. In extreme cases, Ponsolve may be used
	Phenolic gear teeth damaged in either drive motor.	High Speed Drive Motor Low Speed Drive Motor	7 7	Replace motor.
(5) No film drive—Electrical (Drive Motors do not run)	Magazine Locating Switch out of adjustment or Defective.	Magazine Locating Switch	8	Check continuity through the switch when it is actuated manually and also by inserting a magazine. If manual actuation indicates a defective switch, replace the switch, If the switch is not defective but does not operate when a magazine is placed in the cavity, readjust the switch so that it will be actuated by a magazine. (See Adjustments.)
	Defective SCR circuit	SCR package	4	Try a new SCR package.
	Defective coil in Motor Control Reactor.	Motor Control Reactor, Wiring Diagram.	--	Check continuity through the coil of the Reactor. If the circuit is open, replace the Motor Control Reactor.
	Defective coil in Motor Transfer Relay or contacts dirty.	Motor Transfer Relay	4	If film does not advance or rewind at high speed, examine the Motor Transfer Relay and determine whether or not it is actuating when the Motor Control Lever is moved into either of its high speed positions. If relay does not operate, check continuity to the relay coil and replace the relay if necessary. If relay is operating, check continuity through the various contacts and clean them if it is found that poor contact is being caused by dirty or pitted points.

Trouble	Probable cause	Parts/assy. involved	Fig.	Remedy
	Drive Motor brushes worn or brush springs defective.	High Speed Drive Motor Low Speed Drive Motor	7 7	Replace brushes and/or brush springs as required.
	Internal bind in High or Low Speed Drive Motor.	High Speed Drive Motor Low Speed Drive Motor	7 7	Check for binds in Low Speed Drive Motor by turning the shaft manually. Check for binds in the High Speed Drive Motor by holding the Clutch Solenoid in manually and turning the Low Speed Drive Motor shaft by hand. If a bind can be definitely located in either motor, replace the motor.
	Defective High or Low Speed Motor.	High Speed Drive Motor Low Speed Drive Motor	7 7	Check continuity through both fields of the motor involved. Replace the motor if this check indicates that the motor is at fault rather than the brushes.
	Low Speed Adjusting Potentiometer out of adjustment or defective.	Low Speed Adjusting Potentiometer. Wiring Diagram.	4	Place a loaded magazine in the cavity and clamp the Motor Control Lever well into its low speed advance range. Turn the slotted Potentiometer Adjusting Shaft counterclockwise until the film starts to move. Adjust the potentiometer as directed in Adjustments. If the film has not started to move by the time the adjusting shaft has reached its counterclockwise limit of movement, check continuity through the potentiometer and replace it if it is found to be defective.
	Motor Protection Switch out of adjustment or defective.	Motor Protection Switch Drag Shoe Retainers Drag Shoe Retainer Spring Drag Shoe Drum Assy	7 7 7 7	If the High Speed Drive Motor does not operate in either direction or in one direction only, examine the Motor Protection Switch to be certain that it is being actuated by the Drag Shoe Retainers. If the switch is not being actuated, check the tightness of the Drag Shoe Drum Assembly on the Motor Shaft, the anchorage and tension of the Drag Shoe Retainer Spring, and be certain that the Retainers are as-

	Trouble	Probable cause	Parts/assy. involved	Fig.	Remedy
					sembled so the ends held by the spring are toward the front of the reader. (See Adjustments.) If the switch is incorrectly located.) If the switch is being actuated and is adjusted properly and the High Speed Motor still does not operate satisfactorily, check continuity through the switch circuit. Repair any wiring or other electrical defects. Replace the switch if necessary.
(6)	Erratic film movement and "jitter".	Takeup Motor exerting too much torque.	Takeup Motor and Clutch Assembly.	7	Measure the resistance between terminals No. 22 and No. 37 on the Takeup Motor Resistor. This resistance should be 215–230 ohms. If necessary, readjust the No. 37 slider to provide the correct resistance. (See Adjustments.)
			Takeup Motor Resistor	4	
		Film Guides too close together in gate area or clogged with dirt.	Upper Film Guide and Set Screws Assembly.	5,6	Clean both Upper and Lower Film Guides as directed in General Maintenance.
		Lamp Cooling Fan not balanced	Lamp Cooling Fan and Collar Assembly.	--	Readjust Upper Film Guide (See Ajustments.) Place 1/2" wide 7/8" long strips of Scotch Brand electrical tape on the two fan blades which are opposite and to the right of the 3/32" dia. hole in the fan hub. View the fan from the top of the Lamphouse when following these instructions.
		Edges of film badly damaged or frayed.		--	Remove defective sections from roll.
		Faulty film splices		--	Resplice film.
		Severe kinks in film		--	Straighten kinks manually.
		See (4) above under Film Drive for other possible causes.			
(1)	Unsatisfactory film movement control.	Lower Speed Adjusting Potentiometer not set properly.	Low Speed Adjusting Potentiometer.	4	Adjust Potentiometer as directed in Adjustments.)
		Motor Control Switch blades out of adjustment.	Motor Control Unit Assembly	5	Adjust Motor Control Switch. (See Adjustments.)
			Motor Control Switch Assembly	--	

Trouble	Probable cause	Parts/assy. involved	Fig.	Remedy
	Motor Control Reactor out of adjustment.	Motor Control Unit Assembly — Motor Control Reactor ————	5 —	Readjust air gap between the fixed laminations of the Reactor and the free end of the Moveable Reactor Armature. This gap should be .015". (See Adjustments.)
(8) Film jams ————	Takeup Motor not exerting enough torque.	Takeup Motor Resistor (872197).	4	Measure the resistance between terminals No. 22 and No. 37, and between terminals No. 22 and No. 5 on the Take-Up Motor Resistor. If these resistances are not as specified in Adjustments, readjust the sliders on the resistor to provide the correct values.
	Takeup Motor not operating or defective.	Takeup Motor ————	7	Check brushes for wear—replace if necessary. Check for bind in motor shaft. If a bind is found, tap the motor housing to relieve the bind and oil the bearing felts. Check continuity through the Takeup Motor circuit and repair loose connections or other wiring defects. Replace. Takeup Motor and Clutch Assembly or other electrical components, if necessary. Examine the Takeup Motor Resistor for damage or broken wire in the resistor coil.
	Clutch and Magnet Assy. out of adjustment.	Clutch and Magnet Assy. ————	3	The Clutch and Magnet Assy. should be adjusted so that a Magazine Core Assy. remains centered in the magazine hole when it is engaged by the Clutch and Magnet Assy. should be level with the Mechanism Plate and the correct height above it. (See Adjustments.)
	Clutch and Magnet Assy. not engaging core properly because of dirt or other foreign material.	Clutch and Magnet Assy. ————	3	Clean the upper surfaces of the Clutch and Magnet Assembly and remove and foreign material which might prevent proper engagement of the Clutch and Magnet Assembly with the Magazine Core.

Trouble	Probable cause	Parts/assy. involved	Fig.	Remedy
	Defective Magazine Cores ----	Magazine Core ----------	9	Examine cores for dirt, worn chamfer surface, expanded rewind holes, or other conditions which would tend to prevent proper engagement with the Clutch and Magnet Assembly. Clean and replace cores as required.
	Film does not center on core during rewind.	----------	9	Check by winding film onto a core assembly without a magazine. If the film does not center on the core as it is being rewound, tip the Pressure Roller Shaft until the condition is corrected. (See Adjustments.)
	Magazine throat badly worn --	Magazine Assembly ----------	1,9	Replace worn Magazines and readjust the Pressure Roller Shaft. (See Adjustments.)
	Film Guides loose or out of adjustment.	Upper Film Guide and Set Screws Assembly. ----	5,6	Check the anchorage of the Lower Film Guide to the Mechanism Plate. Tighten if necessary. Check the anchorage of the Upper Film Guide to the Lower Film Guide and tighten the Film Guide Springs if necessary. Observe film travel through the Film Guides and readjust the setscrews in the Upper Film Guide as required. Check the location of the left-and right-hand throats of the Film Guides with respect to the Film Drive Roller and the Film Chamber. (See Adjustments.) Readjust as directed.
		Lower Film Guide ----------	5,6	
		Film Guide Springs ----------	6	
	Film Chamber improperly located.	Film Chamber ----------	2	The Film Chamber Stop should be adjusted so that the bottom of the Film Chamber is approximately 1/32" from the end of the Film Guides. (See Adjustments.)
		Film Chamber Stop ----------	--	
	Film Chamber deformed ------	Film Chamber ----------	2	Examine the Film Chamber for deformities which would restrict free movement of film in the chamber or which would hinder

Trouble	Probable cause	Parts/assy. involved	Fig.	Remedy
				or stop film movement as film enters and leaves the chamber. Re-form the Film Chamber wherever necessary.
	Film Chamber Cover deformed	Film Chamber Cover	1	Examine the Film Chamber Cover to be certain that it has not been "dished" in a manner which would hinder free movement of film in the Film Chamber, or that the edge of the cover nearest the Film Guides has not been bent downward to interfere with film as it enters the Film Chamber. Straighten the cover if it is necessary.
	Magazine not engaging Locating Spring properly.	Magazine Assembly Magazine Locating Spring	1,2 3,8	Place a full magazine in the cavity and check the return action of the magazine after it has been pushed in at either corner, pressed down from the top, or raised from the lower edge. If the magazine does not return to its normal operating position after being misplaced by the above actions, readjust the Magazine Locating Spring. (See Adjustments.)
	Magazine Locating Block out of adjustment.	Magazine Locating Block	6	The Magazine Locating Block should be adjusted so that the upper rear edge of the magazine is .030" to .040" from the rear edge of the Magazine Cavity opening. Readjust the Locating Block if necessary. (See Adjustments.)
	Tape strips damaged, worn, or sticky.	Tape	3	Replace tape strips on Mechanism Plate along edges of cavity opening.
	Warped Magazine Case	Magazine Case—Top Half Magazine Case—Lower Half	9 9	Replace Magazine Case.
	Takeup Motor exerting too much torque.	Takeup Motor and Clutch Assembly. Takeup Motor Resistor	7 4	Readjust sliders on the Takeup Motor Resistor to give the resistances specified in Adjustments.

Trouble	Probable cause	Parts/assy. involved	Fig.	Remedy
MISCELLANEOUS				
(10) Magazine can be removed with film in Reader.	Bind in Interlock Blade	Interlock Blade Interlock Blade Pivot	3 --	Operate Interlock Blade manually to determine whether it is binding on the Interlock Blade Pivot. If a bind is found, insert a screw driver between the blade and its pivot and bow the blade until it operates freely.
	Interlock Blade Pivot hanging down at end toward front of reader.	Interlock Blade Pivot Interlock Blade	-- 3	Place a magazine in the cavity and determine whether the Interlock Blade pivots beyond center when the magazine is correctly seated and film has been advanced into the reader. If the Interlock Blade does not operate properly, examine the front end of the Interlock Blade Pivot. If it has dropped down out of its recess so that the blade binds on the magazine, remove the blade and pivot and reform the offset on the front end of the pivot so that it will locate correctly in the cavity when it is reassembled.
	Pivot holes in Interlock Blade worn.	Interlock Blade	3	If the Interlock Blade strikes the magazine before it passes center and the front end of the Interlock Blade Pivot is located properly, check the pivot holes in the Interlock Blade for wear. Replace the blade if the pivot holes are worn to the extent that the blade cannot operate correctly.
	Interlock Blade Spring unhooked or incorrectly assemblied.	Interlock Blade Spring	--	Check the Interlock Blade Spring for anchorage and correct assembly. The spring can be seen on the underside of the cavity, directly beneath the Film Tab Switch.
	Interlock Blade bowed excessively.	Interlock Blade	3	If the Interlock Blade is bowed enough to cause it to bind on the magazine, remove the blade and re-form it so that is does not bind on the magazine of the Interlock Blade Pivot.

	Trouble	Probable cause	Parts/assy. involved	Fig.	Remedy
(11)	Magazine cannot be removed from cavity after all the film has been removed.	Film Tab Switch out of adjustment or defective.	Film Tab Switch	8	Advance a few feet of film into the reader and then rewind a portion of it. Actuate the Film Tab Switch manually to determine whether or not the switch is defective. If the Interlock Solenoid operates when the Film Tab Switch is actuated manually, but not when all of the film is rewound, the switch needs to be readjusted. If the Interlock Solenoid does not operate when the Film Tab Switch is actuated manually, check continuity through the Film Tab Switch circuit. Replace the switch if it is found to be defective.
(12)	Interlock Solenoid noisy or sluggish.	Solenoid guides worn excessively or dirty.	Interlock Solenoid	8	Replace the Solenoid.
		Binds in mechanical linkage or other cavity components.	Interlock Blade Push Rod Solenoid Drag Link Power Failure Lockout Lever Pressure Roller Arm Pressure Roller Arm Stud	8 8 8 8 8	Check the operation of the various Cavity Assembly parts for binds. If binds are found, remove them by re-forming the affected part, by lubrication, or by removal of burrs or sharp corners.
		Formation of Solenoid Drag Link prevents armature seating properly.	Solenoid Drag Link	8	Re-form the Solenoid Drag Link. (See Adjustments.)
		Too much tension on Power Failure Lockout Lever Spring.	Power Failure Lockout Lever Spring.	8	Decrease the spring tension by selecting a different anchor hole. Check film drive if the spring tension is changed.
OPTICAL					
(13)	Uneven image definition.	Projection lens not square with gate.	Prism Bearing Support Assy Prism Mount Assy	13 13	Adjust the large end of the prism mount assembly vertically or horizontally.
(14)	Images do not remain centered on the screen as they are rotated.	Axis of the prism mount not centered on the film gate.	Prism Mount Assy	13	Add shims under the small or projection lens end of the prism mount.
		Prism not adjusted correctly within the prism mount.	Prism Mount Assy	13	This is a factory adjustment. Install a new prism mount assembly.
(15)	Keystoning	Large mirror and/or mirrors mounting bracket out of adjustment.	Mirror Mounts and Bracket Assy.	12	Adjust the large mirror and the bracket as directed.

	Trouble	Probable cause	Parts/assy. involved	Fig.	Remedy
(16)	Images not centered on screen.	Small mirror not adjusted correctly.	Mirror Mounts and Bracket Assy.	12	Adjust the small mirror as directed.
(17)	Images shift erratically on screen when being focused or rotated.	Prism mount assembly loose on its bearings.	Front Prism Bearing Arm Assy Rear Prism Bearing Arm Assy	13	Readjust and tighten bearing arms.
		Bearing tapes worn through, allowing prism mount to wear unevenly because of metal-to-metal contact.	Front Prism Bearing Arm Assy Rear Prism Bearing Army Assy Prism Bearing Bracket.	13 13	Replace bearing tapes and smooth out any roughness on the bearing surface of the prism mount or under the bearing tapes.
MECHANICAL					
(18)	Rotating limits do not permit complete image rotation.	Prism rotating knob loose on control shaft.	Prism Rotating Knob Assy ____	1	Readjust and tighten the knob on the control shaft.
		End play in the prism control shaft allows the pin in the prism rotating knob to pass the stop pin in the control shaft bearing.	Prism Rotating Knob Assy ____	1	Loosen the set screw in the prism rotating knob and adjust it on the control shaft so there is .005 end play.
(19)	Prism rotating knob turns too hard.	Front prism bearing arm assembly adjusted too tightly against the prism mount assy.	Front Prism Bearing Arm Assy	13	Readjust the front bearing arm assembly.
		Rear prism bearing arm assembly adjusted too tightly against the prism mount assembly.	Rear Prism Bearing Arm Assy	13	Readjust the rear bearing arm assembly.
		Lack of sufficient end play between rotating knob and control shaft retaining ring.	Prism Rotating Knob Assy ____	1	Loosen the set screw in the prism rotating knob and adjust it on the control shaft so there is .005 end play.
		Prism drive chain too tight.	Prism Drive Chain _____ Prism Drive Sprocket Bracket Assy.	13 13	Readjust chain tension.
(20)	Bind in prism rotating mechanism or squeak when prism is rotated.	Prism bearing tapes worn through allowing metal-to-metal contact.	Front Prism Bearing Arm Assy. Rear Prism Bearing Arm Assy. Prism Bearing Brkt. Assy.	13	Replace bearing tapes and smooth out any roughness on the prism mount or the bearing surfaces underneath the tapes.

C. Adjustments

1. Reflector

Correct Reflector and Projection Lamp (fig. 6, items 3 and 4) alignment, which is necessary for good overall screen brightness, has been carefully set at the factory. However, readjustment may eventually become necessary.

a. To check the alignment of the Reflector and Projection Lamp, remove the Screen (fig. 1, item 4), and plug in the power cord.

b. Press the Interlock Solenoid Switch (fig. 3, item 4) to separate the Pressure Roller (fig. 8, item 13) from the Drive Roller (fig. 8, item 9) so that a short length of heavy density film may be threaded between the rollers and into the channel formed by the Upper and Lower Film Guides (fig. 5, items 4 and 5). Release the interlock Solenoid Switch.

c. Use the left hand to depress the Magazine Locating Switch Link (fig. 3, item 3). While holding this link down, actuate the Interlock Solenoid Switch. With the right hand, move the Motor Control Lever (fig. 1, item 10) in the "ADVANCE" direction until the end of the film strip has been advanced beyond the gate area.

d. Two lamp filament images can now be seen on the mirror when the Interlock Solenoid Switch is actuated manually. The primary image and the reflected image should be tangent but not overlapping, and both images should be centered in the lens aperture. The primary image appears below the secondary image.

Note. An alternate method of viewing the filament images without using heavy density film is to remove the screen, actuate the Interlock Solenoid Switch with the eyes averted from the mirror, then release the switch and observe the filament images as they fade out.

e. If examination of the lamp filament images indicates that adjustment is necessary, proceed as follows:

(1) Remove the Lamphouse Cover (fig. 5, item 7), loosen the Illumination Assembly Mounting Screw, located directly in front of and below the Reflector, and move the Illumination Assembly as far toward the mirror as possible.

(2) To center the filament images in the aperture, swing the Illumination Assembly right or left as required. Tighten the Illumination Assembly Mounting Screw when the images are centered.

(3) To center the reflected image over the primary image and to make them tangent, bend either or both of the reflector clips forward or backward as required. To bend the clips toward the mirror, place a screwdriver between the Lamphouse, (fig. 6, item 1) and the clip; and use the screwdriver as a lever to pry against the clip. To bend the clips toward the screen, place a screwdriver blade in the slots provided at the base of the clips.

(4) To raise or lower both images in the aperture, turn the reader onto its right side or its back, and remove the Bottom Cover. Loosen the Locknuts (fig. 7, item 21) on the Lamphouse Support Plate Screws and turn both screws as required to center the filament images vertically in the aperture. The Lamphouse Support Plate Screws are located in the Mechanism Plate toward the front and at either side of the Lamphouse. Since these screws also secure the Film Chamber Stop, check its adjustment before tightening the locknuts. Replace the Bottom Cover and tip the reader back to its normal position.

2. Mirror

Before adjusting the Mirror, place a loaded magazine in the Magazine Cavity (fig. 1, item 2) and advance enough film so that an image can be focused on the screen. If the mirror is badly misaligned and requires a large amount of readjustment, focus should be rechecked as the adjustment operation proceeds. To align the mirror correctly with respect to the Projection Lens (fig. 5, item 9) and the screen, make the following adjustments:

a. Turn the lower Mirror Adjusting Screw (fig. 5, item 20) until a 1/16" wide black shadow (umbra) appears across the bottom of the screen when viewed from the front. This shadow can be seen more clearly if the

film image, used for focusing, is removed from the screen.

b. Loosen the 4 Mirror Support Bracket Screws (fig. 5, item 19) and move the Mirror Support Bracket (fig. 5, item 16) forward or backward until the black shadow (umbra) plus the lighter shadow (penumbra) just disappears from the top of the screen. Tighten the Mirror Support Bracket Screws and recheck.

c. Turn the lower Mirror Adjusting Screw until all shadow disappears from the bottom of the screen and the shadow at the top of the screen is 1/8" to 3/16" in width.

d. Turn the upper left-hand (from a position facing the front of the reader) Mirror Adjusting Screw until the shadow width is the same at each upper corner of the screen.

e. Turn the lower Mirror Adjusting Screw until shadow width is the same at both the top and bottom edges of the screen.

f. The final shadow showing at the top and bottom of the screen should be approximately 1/16" wide and consist of penumbra only. If the shadow width includes some umbra, turn all three Mirror Adjusting Screws the same amount in the direction required to meet this final shadow specification.

3. Magazine

The Magazine (fig. 1, item 3) is located in the Magazine Cavity (fig. 1, item 2) by the Magazine Locating Block (fig. 6, item 11). When a magazine is held in operating position by the Magazine Locating Spring (fig. 3, item 6), the upper rear edge of the magazine should be .030"–.040" from the rear edge of the Magazine Cavity opening. To make this adjustment, proceed as follows:

a. Obtain a strip of material .030"–.040" thick to use as a gauge.

b. Turn the reader on its right side, remove the Rear Cover and Bottom Cover, and loosen the Magazine Locating Block Mounting Screw which is on the underside of the Mechanism Plate.

c. Place a magazine in the cavity with the .030"–.040" strip between the upper rear edge of the magazine and the rear edge of the Magazine Cavity opening. Hold the magazine tightly against the gauge strip and move the Magazine Locating Block against the magazine. Hold the block in this position while tightening its mounting screw.

d. Replace the Bottom Cover and tip the reader back into its upright position. Replace the Rear Cover.

4. Drive Roller

The film Drive Roller (fig. 8, item 9) provides the driving force to advance or rewind film through the reader. To function properly, the Drive Roller must be correctly adjusted with respect to the lower leading edge of the magazine and with respect to its position above the Mechanism Plate.

a. When the Drive Roller Shaft is located 2 11/16" to 2 23/32" from the edge of the Mechanism Plate, the Drive Roller will be correctly positioned. This distance can be checked by placing a steel scale against the shaft and measuring to the edge of the plate. If an adjustment is necessary, loosen the front High Speed Motor Mounting Screw (fig. 5, item 12). This screw is one of two which fasten the High Speed Motor to its Mounting Plate, and it is accessible from the top of the Mechanism Plate. When this screw is loosened. the High Speed Motor can be pivoted about its rear Mounting Screw until the Drive Roller Shaft is correctly located with respect to the edge of the Mechanism Plate, and therefore with respect to the lower leading edge of the magazine. Retighten the screw after the required location has been obtained.

b. The lower surface of the Drive Roller should be .300" above the Mechanism Plate. This adjustment is accomplished by disassembling the Power Failure Lockout Lever (fig. 8, item 8), then loosening the expansion head screw in the end of the Drive Roller Shaft, and moving the Drive Roller up or down on the shaft as required. When loosening or tightening the expansion head screw, the Drive Roller Shaft can be kept from turning by pressing on the Clutch Solenoid Armature. A short steel scale can be held along side the Drive Roller and viewed through the cavity opening to measure the distance be-

tween the Drive Roller and the Mechanism Plate. When the roller has been properly located, tighten the expansion head screw.

5. Switches

There are 3 switches on the Magazine Cavity Assembly which must be adjusted correctly in order to operate properly. The switches are Interlock Solenoid Switch (fig. 3, item 4), Magazine Locating Switch (fig. 8, item 4), and the Film Tab Switch (fig. 8, item 16). There are also two switches mounted on the Takeup Motor Mounting Plate which may also require adjustment. They are the Motor Protection Switch (fig. 7, item 17), and the Interlock Solenoid Hold Switch (fig. 7, item 16). The functions of these switches and the adjustments required are as follows:

a. The Motor Protection Switch protects the High Speed Drive Motor (fig. 7, item 11) from "flash" due to excessive current when the direction of film travel is changed at high motor speeds. The Interlock Solenoid Hold Switch holds the Interlock Solenoid Armature in long enough after the film has all been rewound into the magazine so that inadvertent actuation of the Motor Control Lever (fig. 1, item 10) will not allow the Pressure Roller to be pulled against the Drive Roller as it coasts to a stop. Under such circumstances, the film tip can be driven behind the film Drive Roller and then will not advance properly. Both of these switches are actuated by the Drag Shoe Retainers (fig. 7, item 13) and they should be adjusted to actuate after the retainers have travelled through an arc of approximately 45°. Be sure that the Drag Shoe Retainers exert more than enough force to actuate the switches.

b. Operation of the Interlock Solenoid Switch actuates the Interlock Solenoid (fig. 8, item 5), turns on the Projection Lamp (fig. 6, item 4), and turns on both Fan Motors (fig. 7, items 3 and 19) if the Solenoid Hold Switch is actuated. This switch should be adjusted so there is .005"–.010" reset overtravel and so that it cannot "open" when there is a magazine in the cavity. To obtain the required amount of reset overtravel, remove the Screen (fig. 1, item 4), loosen the left-hand switch mounting screw, and pivot the switch about its other mounting screw until there is some reset overtravel but not more than .010". If the switch "opens" when a magazine is inserted in the cavity and pushed toward the rear, bend the Switch Actuating Lever so that it extends farther into the cavity. This can be accomplished by using two small screw drivers with flat blades. After the lever has been bent, check the reset overtravel and readjust if necessary.

c. The purpose of the Magazine Locating Switch is to prevent operation of the reader until a magazine is correctly seated in the Magazine Cavity. Unless this switch is "closed," the Motor Control Switch Assembly is inoperative and film cannot be advanced or rewound. To adjust this switch, remove the Screen (fig. 1, item 4) and push out both the Pilot Lamp and Warm Up Switch (fig. 1, items 6 and 7). Loosen both switch mounting screws and with a screw driver extended through the Pilot Lamp or Warmup Switch opening in the Name and Data Plate (fig. 1, item 5). Move the switch until it actuates when the Magazine Locating Switch Link (fig. 3, item 3) is .010"–.020" above the Mechanism Plate and position it left to right so the switch mounting screws are centered in their respective slots. After completing the above adjustments, check to be certain that the Switch Actuating Lever and the Switch Link operate freely. If a bind occurs, bend the link as required to insure free operation. If the link has to be bent, re-check the switch actuation point and readjust if necessary. Replace the Warmup Switch, Pilot Lamp, and Screen.

d. The Film Tab Switch is actuated by the tab on the Film Leader (fig. 9, items 7 and 8) when all of the film has been rewound back into the magazine. Actuation of this switch energizes the Interlock Solenoid (fig. 8, item 5) so that the magazine may be removed and causes the Film Tab Relay (fig. 4, item 16) to drop out, thus stopping the Takeup Motor. To adjust the Film Tab Switch correctly, three distinct adjustments must be made in the following sequence:

(1) Remove the Rear Cover. Hold the Film Tab Switch Lever (fig. 8, item 15) with

pliers at the point where the stop projection extends out from the lever. Use another pair of pliers to bend the stop projection so that it stops the lever when the tip of the lever is .020"–.030" from the film. To gage this distance, insert a thin straightedge, such as a steel scale, between the Pressure Roller (fig. 9, item 13) and the Drive Roller (fig. 9, item 13) and the Drive Roller (fig. 9, item 9) and hold the straightedge so that it is approximately .040" from the rear magazine locating shoulder on the cavity. Form the stop projection so that the tip of the lever is .020"–.030" from the straightedge.

(2) Loosen the right-hand switch mounting screw and adjust the switch so that there is .006"–.008" reset overtravel. To judge the amount of overtravel, place one thickness of IBM card between the stop projection of the Switch Lever and the Cavity Wall. Then adjust the switch to reset just as the stop projection touches the IBM card. While making this adjustment, actuate the switch by moving the tip of the Switch Lever which extends into the cavity.

(3) Close the Interlock Solenoid by pressing in against the center of the armature. Then use pliers to form the Interlock Blade Push Rod (fig. 8, item 6) so that the Film Tab Switch Lever has .030"–.040" overtravel before the lever bottoms against the switch case. Check the Push Rod for chamfer, lubrication, and freedom of movement.

6. Film Guides

The Upper and Lower Film Guides (fig. 5, items 4 and 5) fit together to form a channel which guides the film as it is advanced from the magazine to the Film Chamber (fig. 2, Item 2) or rewound from the Film Chamber back into the magazine. (Product specifications state the Lodestar will handle 5 1/2 mil. film.) If all machine adjustments are correct and film preparation is correct, film movement troubles should be at a minimum. If it becomes necessary to adjust the Film Guides, proceed as follows:

a. Remove the Screen (fig. 1, item 4) and Rear Cabinet Cover.

b. Check the anchorage of the Lower Film Guide to the Mechanism Plate and of the Upper Film Guide to the Lower Film Guide. If the Lower Film Guide is loose on the Mechanism Plate, tighten the Film Guide Mounting Screws. To tighten the mounting screws, it is necessary to tip the reader onto its right side or back and remove the Bottom Cover. In addition, it is much easier to tighten the extreme right-hand mounting screw if the Large Air Duct (fig. 7, item 2) is removed If the Upper Film Guide is not securely positioned on the Lower Film Guide, remove both Film Guides and the Film Guide Springs. Form the upper sections of the springs closer together with pliers and reassemble the guides and springs to the Mechanism Plate. After tightening the Lower Film Guide Mounting Screws, back off each of the two center screws from 3 to 5 degrees to release torsional warp transmitted to the guide through the screws. The following checks and adjustments should be made whenever advance Film Transport trouble is encountered.

1. The film must be wound evenly on the Magazine core. Wax the film with Simonize paste floor wax by squeezing wax through the mesh of a cotton cloth and applying a smooth even moist wax coat to the film edges.
2. The Festoon Chamber and Cover should be waxed with a light coat of Simonize paste floor wax.

c. If it becomes necessary to adjust the Film Gate, it should be adjusted as close to the Lower Guide as possible without interfering with Film Travel. To obtain this adjustment, proceed as follows:

1. Obtain a 12" piece of film punch a 1/4-inch hole two inches from one end. Place a Magazine between the Pressure Roller Reed and the Cabinet, this is to separate the Pressure Roller from the Drive Roller by a very small amount. Remove the Upper Guide and adjust the two Gate Adjusting Screws (the screws nearest each side of the Gate) so that they are even with the Guide edge. Adjust the two Film Guide Eccentric Screws to their front-to-rear center position. Replace the Upper Guide and remove the Lens. Thread the piece of film with the hole end first into the Guides until the

hole appears in the Gate (as seen in the Rear Mirror). Turn the right-hand Gate Adjusting Screw clockwise until there is no drag on the film as it is moved in and out of the Guides. Then turn the right-hand screw one-quarter turn counterclockwise. This will put drag back on the film. Then turn the left-hand Gate Adjusting Screw clockwise until the film just starts to move with no drag. Then turn the right-hand screw one-quarter turn clockwise.

2. To check the adjustment, place the tapered end of a pencil which has been cut off, so it will only protrude through the quarter inch hole in the film by 1/16th inch into the hole in the film in the Gate Area and gently move the film in an up and down motion. There should be only a barely preceptible up and down movement of the film, if there is too much movement the Gate will have to be readjusted. If the adjustment is correct, replace the Lens, remove the Magazine from the pressure Roller Reed and check operation.

d. The Lower Film Track Entrance should be centered on the tangent of the Film Drive Roller and its Pressure Roller. This can be done by loosening the extreme left-hand Film Guide Mounting Screw and moving it until it is in line and retighten the Screw.

e. The other end of the Film Guides may also be adjusted by loosening the right-hand Film Guide Mounting Screw and shifting that end of the Film Guides until it fits the opening provided in the Film Chamber (fig. 2, item 2).

f. In case of rewind Film Transport troubles, the following should be checked:

1. The Rewind Torque should be at high torque.
2. Check the Capstan Roller Drive Clutch to make sure it rides free in a clockwise (looking down on the roller) direction.

g. Reassemble the Large Air Duct, Bottom Cover, Rear Cabinet Cover, and Screen. Even though more than 100 feet of non spliced film less than 5 1/2 mil. can be packed in a Magazine, the use of more than 100 feet in a Magazine may increase the incidents of Film Transport troubles.

7. Focusing Mechanism

Focusing images on the Screen (fig. 1, item 4) is accomplished by moving a Focusing Arm (fig. 1, item 8) which projects through the Name and Data Plate (fig. 1, item 5). Movement of the Focusing Arm is transferred to the Projection Lens (fig. 5, item 9) by means of a Focusing Lever (fig. 5, item 3). Moving the Focusing Arm to the right or left moves the Projection Lens away from or toward the film in the Film Gate to focus film images on the screen.

a. If difficulty is experienced in obtaining good focus at the top and bottom of the screen, tilt the "gate" area of the film guides as follows:

(1) Remove the Rear Cabinet Cover and the Screen.

(2) Loosen the Illuminator Assembly Mounting Screw and shift the Assembly as far toward the front of the Reader as possible.

(3) Attach small strips of "Translite" film, onion skin paper, or similar material, upon which an image can be focused, to the top center and bottom center of the Screen Frame so the Strips project on a straight plane across the window.

(4) Advance the film until an image suitable for focusing adjustment appears in the Film Guide gate area.

(5) Use the Lodestar Focusing Arm to bring the Image into focus on the strip at the bottom of the Screen Frame. This represents the top of the film image in the gate.

(6) Then bring the image into focus on the strip at the top of the Screen Frame, noting whether it is necessary to move the Lens closer to, or farther away from, the film. In this manner, it is possible to analyze the reason for poor top to bottom focus, and thus determine whether the Lower Film Guide must be moved toward or away from the Lens to correct the condition.

(*a*) If it necessary to move the Lens toward the film to focus the image on the top strip, then the same result can be obtained by moving the lower Film Guide toward the Lens. The Lower Film Guides have had to be moved in this direction on all readers since this method of adjustment became effective.

(*b*) Should it become necessary to move the Lens away from the film to obtain good focus on the top strip, it indicates that the Lower Film Guide must be moved away from the lens to correct poor top to bottom focus.

(7) Loosen both center Lower Film Guide Mounting Screws. If it has been determined that the Lower Guide must be moved toward the Lens, manually push the gate area of the Guide in that direction while tightening the Mounting Screw nearest the Cavity first, and then tightening the other one. If, on the other hand, the Guide has to be moved away from the Lens, manually push the gate area in that direction while tightening the Mounting Screw farthest from the Cavity first, and then tightening the other Screw. In either case, both Screws should be drawn up as tightly as possible and not backed off 3 to 5 degrees as previously mentioned.

(8) Next, refocus the image on the strip at the bottom of the Screen Frame, and then again at the top. If the top-to-bottom focus is still unequal, and it is necessary to move the Film Guide still closer to the Lens, make this final corrective adjustment by placing a Screwdriver Blade or other suitable tool against the center of the Lower Guide and move the Guide toward the Lens by prying against the Lamphouse. Be careful not to pry against the Condenser Lens or Condenser Bracket. Check top to bottom focus as the Guide is moved and continue to move the Guide until the top and the bottom of the image come into sharpest focus at the same time.

(9) If it is necessary to move the lower Film Guide away from the Lens proceed in the same manner described in step (8) above, but place the blade screwdriver on the other side of the Film Guide and pry against the vertical lens support tab.

(10) Move the illumination assembly back toward the film guide as far as possible. Adjust the assembly right or left as required to center the lamp filament images in the aperture, and tighten the screw. This action brings the rear tip of the illumination bracket against the lower film guide and helps to maintain its position.

(11) Reassemble the screen and make a final check to be certain that top-to-bottom focus is satisfactory.

b. Side-to-side focusing trouble can be similarly corrected.

c. Excessive backlash in the focusing mechanism can be corrected by—

(1) Placing a screwdriver blade in the slot provided and widening the end of the Focusing Lever which engages the Projection Lens barrel. If it is noted that the end of the Focusing Lever is already too wide to engage the lens barrel properly, do not squeeze the end with pliers. If a burr or flat surface is produced by the use of pliers, the lens will "rock" as it moves instead of traveling in a straight path. Carefully file or stone the end of the lever to reduce its width without producing burrs or a flattened surface.

(2) Removing the Focusing Lever and prick punching four places around the Pivot Stud hole to reduce its size.

(3) Using pliers to reduce the size of the slot which engages the Focusing Arm Stud.

d. If images come into focus at either end of the Focusing Arm movement, center the Focusing Arm and turn the Focus Lever Pivot Stud Adjusting Screw (fig. 5, item 15) in whichever direction is required to produce a sharp image on the screen.

8. Takeup Motor Clutch and Magnet Assembly

The Takeup Motor Clutch & Magnet Assembly (fig. 3, item 2) must be correctly located with respect to the Magazine Core Assembly (fig. 9, items 4 and 5) so that the Takeup Motor (fig. 7, item 15) will produce the desired tensioning and rewind action. In order to engage the Magazine Core Assembly and function properly, the Clutch & Magnet Assembly must be positioned so that its upper surface is parallel to the Mechanism Plate and .100" above it. Its lateral location must be such that, as the Magazine Core Assembly revolves, it remains centered in the Magazine Case hole (fig. 9, item 2). The following

steps are necessary to adjust the Clutch & Magnet Assembly correctly:

a. Remove the Rear Cover and Screen, turn the reader on its right side, and remove the Bottom Cover.

Note. Check all the Clutch and Magnet Assembly adjustments with the reader in an upright position.

b. Remove the 3 screws which mount the Takeup Motor, Bracket, and Protection Switch Assembly, and pull the assembly far enough away from the Mechanism Plate so that the lock nuts on the Takeup Motor Mounting Screws can be loosened. Remount the assembly on the Mechanism Plate. Three locating pins insure the correct positioning of the assembly on the plate.

c. Turn the Takeup Motor Mounting Screws until the top surface of the Clutch & Magnet Assembly is .100" above the Mechanism Plate and parallel to it. This can be determined accurately by placing a strip of sheet metal or other flat material on the top surface of the Clutch & Magnet Assembly and using a #39 (995) drill to gage height and parallelism.

d. To determine whether the Clutch & Magnet Assembly is correctly located laterally, use short strips of tape to form a .030" eccentric buildup on the hub of a Magazine Core (5 layers of Scotch Brand electrical tape equal .030" approximately). Then insert the lower half of a Magazine Case (fig. 9, item 2) in the cavity and place the eccentric core on the Clutch & Magnet Assembly. Hold the half of a Magazine Case out and to the rear of the cavity as the core is revolved manually to determine whether or not there is at least .030" clearance between the Magazine Core and the Magazine Case. If no binds occur as the core is revolved through 1 complete revolution, again remove the Takeup Motor, Bracket, and Protection Switch Assembly from the Mechanism Plate, and tighten the locknuts on the Takeup Motor Mounting Screws. Remount the assembly on the Mechanism Plate.

e. If the eccentric core binds on the case because of a lack of concentricity of .020" or less, the Clutch and Magnet Assembly may be centered by slight adjustments to the Takeup Motor Mounting Screws.

f. If the eccentric core binds because of a lack of concentricity which is too great to correct by small adjustments to the Takeup Motor Mounting Screws, remove the pins which locate the Takeup Motor Bracket and Protection Switch Assembly on the Mechanism Plate. Retain these pins. Use a screwdriver and mallet to move the assembly in the direction required to relieve the bind and center the Clutch & Magnet Assembly. As soon as the core with the .030" eccentric buildup on the hub revolves without interference, tighten the screws which fasten the Takeup Motor Bracket and Protection Switch Assembly to the Mechanism Plate. Turn each of the screws a small amount at a time so that the assembly will not shift on the Mechanism Plate as the screws are tightened.

g. After the mounting screws are tightened, check again for interference between the eccentric core and the Magazine Case. If the test core revolves freely, repin the bracket to the Mechanism Plate. Drill new holes with a #47 or 5/64 drill and use the pins previously removed.

h. Replace the Bottom Cover, tip the reader back to its normal operating position, and replace the Screen and Rear Cover.

Note. Check the Takeup Motor periodically for worn brushes and binds in the shaft. Replace the brushes when necessary. Place a core on the Clutch and Magnet Assembly and turn the shaft manually to check for binds. If binds are noted, tap the motor housing lightly near the bearings until the shaft rotates smoothly.

9. Interlock Solenoid

a. The Interlock Solenoid (fig. 8, item 5) operates to set up the Cavity Assembly to receive a magazine and to prevent removal of a magazine from the cavity while film is on the reader. As a magazine is placed in the cavity, the solenoid is energized and remains energized until film starts to advance into the reader. It is then deenergized and the magazine is locked in the reader cavity until the solenoid is again energized when all the film has been wound back into the magazine.

b. The Interlock Solenoid requires no adjustment unless it "buzzes" or chatters. This condition can be corrected by increasing or decreasing the bend angle in the Solenoid Drag Link (fig. 8, item 7) so that the armature can seat squarely and firmly when it is pulled in.

10. Power Failure Lockout Lever

The Power Failure Lockout Lever (fig. 3, item 7, and fig. 8, item 8) prevents inserting and locking a magazine in the reader when it is inoperable due to some electrical failure. It also locks a magazine in the reader if an electrical failure occurs while film is being advanced or rewound.

a. To check the Power Failure Lockout Lever, remove the Rear Cover, place a magazine in the cavity, and pull the Lockout Lever forward until the magazine moves. The lever should move .020"–.030" before the magazine moves. To obtain this amount of movement, reform the lever at the right angle bend which is directly above the Pressure Roller (fig. 8, item 13). After making this adjustment, recheck with a magazine to see that the lever is correctly aligned with the opening in the magazine when the Interlock Solenoid (fig. 8, item 5) is pulled in. Correct alignment can be obtained by reforming the bend in the Solenoid Drag Link (fig. 8, item 7) where the link engages the Pressure Roller Arm (fig. 8, item 12). If it is necessary to reform the Drag Link, be sure that there is at least a 3/16" opening between the Pressure Roller and the Drive Roller (fig. 8, item 9) when the Interlock Solenoid is pulled in.

b. Check the Lockout Lever for burrs and sharp corners on all surfaces or edges which are in contact with the Magazine Cavity.

11. Magazine Locating Spring

The Magazine Locating Spring (fig. 3, item 6, and fig. 8, item 2) exerts pressure against the magazine to locate it against the shoulders of the cavity, the Magazine Locating Block (fig. 6, item 11), and the Mechanism Plate. The spring should return a magazine firmly to its operating position after the magazine has been pushed in at either corner, pressed down on the top edge, or lifted slightly from the lower edge. Swing the Interlock Blade (fig. 8, item 5) out of the way when making this last cheik. If adjustment is neressary, it is recommended that the cavity be removed so that the Locating Spring is more accessible.

a. The coil of the Locating Spring which bears against the corner of the magazine should be adjusted so that the return pressures at each corner are approximately equal. This can be accomplished by using sharp-nosed pliers to alter the plane of this coil so that the desired return pressures are obtained.

b. The downward pressure exerted by the Magazine Locating Spring can be improved by applying graphite or other recommended lubricating compound to the locating shoulders of the cavity.

c. A strip of Teflon glass fibre tape has been placed on the Mechanism Plate along the cavity side walls to improve the sliding action of the magazine. These strips should be examined to be sure that they have not been damaged or that the ends have not turned up in a manner to hinder the sliding action of the magazine.

12. Power Failure Lockout Lever Spring

The Power Failure Lockout Lever Spring (fig. 8, item 3) acts as a return spring to reverse the mechanical action produced by actuation of the Interlock Solenoid (fig. 8, item 5). The tension of this spring can be increased or decreased by selecting a different anchor hole. If the action of the Interlock Solenoid is sluggish and no other reason for the sluggish action can be found in the mechanical operation of the Cavity Assembly components, the spring tension should be decreased. If the Drive Roller (fig. 8, item 9) slips on the film, increase the spring tension.

13. Pressure Roller

The Pressure Roller (fig. 8, item 13) is held against the Drive Roller (fig. 8, item 9) by spring tension to provide friction between the Drive Roller and film so the film can be advanced into the reader or rewound into the magazine.

a. To align the Pressure Roller vertically with the Drive Roller, use pliers to grip that portion of the Pressure Roller Arm (fig. 8,

item 12) which supports the Pressure Roller and form the arm so there is full contact between the rollers in a line approximately perpendicular to the Mechanism Plate.

b. If the Pressure Roller and the Drive Roller do not drive the film straight, loosen the Pressure Roller Shaft Assembly Mounting Screw and tip the shaft one way or the other until the film travel is satisfactory. Raise or lower the shaft in the slot so that the top edges of both rollers are flush when the Pressure Roller Arm is pulled up.

14. Film Chamber

The Film Chamber (fig. 2, item 2) provides a storage area for the film after it has been advanced through the reader. The Film Chamber Stop, which is located on the Mechanism Plate directly in front of the Lamphouse (fig. 5, item 8), determines the positioning of the Film Chamber. The stop should be adjusted so that the chamber is located as far toward the lamphouse as possible without touching the end of the Film Guides (fig. 5, items 4 and 5),

a. If it is necessary to adjust the Film Chamber Stop, move the stop on the Mechanism Plate by placing a screwdriver blade against the stop and tapping the screwdriver with a mallet to obtain the required location. Do not loosen the screws or locknuts, since this could distrub the alignment of the Illumination Assembly (Reflector, Lamp, and Condenser Lenses).

b. Check the Film Chamber to be sure that it is formed down enough in the area where the film enters so that the film cannot become caught as it enters or leaves the chamber.

15. Drive Chain

The Drive Chain (fig. 7, item 9) should be as tight as possible without interfering with the movement of the Clutch Sprocket Assembly (fig. 7, item 10) on the High Speed Motor (fig. 7, item 11) shaft.

a. To adjust chain tightness, loosen the 3 screws (Fig. 6, Item 16) which fasten the Low Speed Motor and Mounting Plate Assembly (fig. 7, item 8) to the Mechanism Plate, and move the assembly right or left as required to obtain the desired chain tension. Retighten the mounting screws, being careful that the nuts on the bottom of the Motor Mounting Plate do not turn with the screws.

b. The Motor Sprocket can be aligned with the Clutch Sprocket by loosening the left-hand Low Speed Motor Mounting Screw (fig. 6, item 15) and pivoting the Low Speed Drive Motor on its Mounting Plate until the sprockets are in correct alignment. Retighten the screw.

c. After both of these adjustments have been completed, turn the Low Speed Drive Motor Shaft by hand and check the action of the Clutch Sprocket Assembly on the High Speed Motor Shaft. The Clutch Sprocket Assembly should slide freely on the shaft regardless of its position. Also, these adjustments should be made with the reader in an upright position, since the weight of the Low Speed Motor causes a different chain tension when the reader is on its side.

16. Clutch Solenoid

Operation of the Clutch Solenoid connects the drive of the Low Speed Motor (fig. 7, item 8) to the High Speed Motor (fig. 7, item 11) shaft to advance or rewind film at low scanning speeds. The Clutch Solenoid also acts as a brake on the High Speed Motor since it is energized as the Motor Control Lever (fig. 1, item 10) passes through the Low Speed range as it returns to its neutral position. Braking action is provided by the High Speed Motor Clutch Plate slipping on the face of the Clutch Sprocket (fig. 7, item 10). A capacitor (fig. 4, item 6) holds the Clutch Solenoid in to provide additional braking action after the Motor Control Lever has reached its neutral position.

a. The Clutch Solenoid should be adjusted so that the time required for the film to stop will equal the time required for the Solenoid to drop out when there is nearly a full roll of film rewinding at high speed. The Solenoid should be carefully adjusted to meet this requirement with a minimum of force so that the braking action in the high speed advance direction will not be so abrupt that a loop is thrown in the magazine.

b. To make this adjustment, back off each of the 3 Solenoid Mounting Plate Adjusting Nuts an equal amount until the Solenoid Armature seats before the clutch faces make contact. The adjusting nuts are accessible through the back of the reader cabinet. Then tighten all 3 nuts by equal amounts until the solenoid exerts just enough force on the clutch surfaces to enable the Low Speed Motor to drive film. Continue to tighten the adjusting nut closest to the mirror well until the film stops moving at approximately the same time as the clutch disengages after the Motor Control Lever has returned to its neutral position from a high speed rewind position with nearly a full roll of film in the magazine.

c. The Clutch Solenoid should not be adjusted beyond the point described in *b* above because further adjustment will result in unreliable braking action due to failure of the Solenoid Armature to seat. Since different voltages are applied to the solenoid, uniform braking action cannot be maintained unless the armature seats regardless of which voltage is applied.

17. Film Cooling Fan

The Film Cooling Fan (fig. 7, item 3) provides ventilation to cool film in the gate area (fig. 6, item 10) of the Film Guides (fig. 5, items 4 and 5).

a. To adjust the fan on the Fan Motor Shaft or to replace the fan, disassemble the Projection Lamp Transformer (fig. 7, item 7) by removing 4 mounting screws on top of the Mechanism Plate to the right of the mirror well. Remove the Small Air Duct (fig. 5, item 6) from the Mechanism Plate. The Film Cooling Fan Housing can now be dismounted from the Mechanism Plate by taking out 4 mounting screws, two of which are under the Motor Control Switch Assembly (fig. 5, item 1), one under the Small Air Duct, and one becomes accessible with the removal of the Projection Lamp Transformer. Remove the Film Cooling Filter (fig. 7, item 1).

b. After relocating the fan on the Fan Motor Shaft or replacing the fan, install the Filter and Filter Spring and hold the housing in its normal position to check for interference between the fan blades and the filter while the fan is running. Reassemble the Fan Housing, Small Air Duct, and the Lamp Transformer to the Mechanism Plate.

18. Motor Control Switch

Movement of the Motor Control Lever (fig. 1, item 10) opens and coses contacts on the multiple blade Motor Control Switch in the Motor Control Unit Assembly (fig. 5, item 1) to control the direction and speed with which film is driven through the reader.

a. For the adjustment of the Rewind side of the switch, refer to the Circuit Diagram (part number 872064) and adjust the switch blades as follows:

(1) The first pair of contacts, No. 37 and No. 4, closest to the Switch Actuator, should close first. This actuates the Clutch Solenoid.

(2) The third pair of contacts, No. 6 and No. 37, should close just after the first pair. These are the Low Speed Motor contacts.

(3) The second pair of contacts, No. 4 and No. 5, should close just after the Motor Control Lever picks up the Motor Control Lever Spring. These contacts cut out most of the Takeup Motor resistance and if they close too soon, vibration of screen images may result during slow speed rewind.

(4) The fourth set of contacts, No. 37 and No. 7, should close just after the second (Takeup Motor) set of contacts close. The fourth set is for the High-Speed Motor.

b. For the adjustment of the Advance side of the switch, refer to the Circuit Diagram and adjust the Switch Blades as follows:

(1) The first set of contacts, No. 37 and No. 4, should close first, since this actuates the Clutch Solenoid.

(2) The second set of contacts are not used since the Takeup Motor Resistance does not need to be changed when film advance changes from Low Speed to High Speed.

(3) The third pair of contacts, No. 2 and No. 37, should close just after the first pair. This supplies power to the Low Speed Motor.

(4) The fourth pair of contacts, No. 37 and No. 1, should close just after the Motor

Control Lever picks up the Motor Control Lever Spring. These contacts are for the High Speed Motor.

c. Whenever adjustments are being made on the Motor Control Switch, care should be taken so that the clutch contact gap and the Slow Speed Motor contact gap are approximately the same for either direction of film movement.

19. Name and Data Plate

The Name and Data Plate (fig. 1, item 5) should be positioned so it rests lightly on the Film Chamber Cover (fig. 1, item 11).

a. To adjust the Name and Data Plate up or down, loosen the 3 mounting screws in the front of the plate and move it as required. Tighten the screws after the correct adjustment has been attained.

b. The Name and Data Plate Bracket, to which the Name and Data Plate is secured, should be adjusted as far to the rear as possible. Remove the Film Chamber (fig. 2, item 2) and loosen 4 button-head screws to make this adjustment.

20. Takeup Motor Resistor

The Takeup Resistor (fig. 4, item 18) controls the torque of the Takeup Motor (fig. 7, item 15). When film is being advanced at low or high speed the Resistor controls the Takeup Motor to transmit low tension to the film. When film is rewound, the Resistor is switched so the Takeup Motor applies high tension to the film. The Resistor should be adjusted as follows:

Torque adjustments are made by means of two Tubular Resistors (both R1), located below the Film Chamber, which control the voltages applied to the Takeup Motor. The right-hand Resistor adjusts high torque, and the left-hand one adjusts low torque. For both Resistors, moving the Contact Straps back increases torque.

PS, PS–1, and PES Takeup Motor Torque Measurements

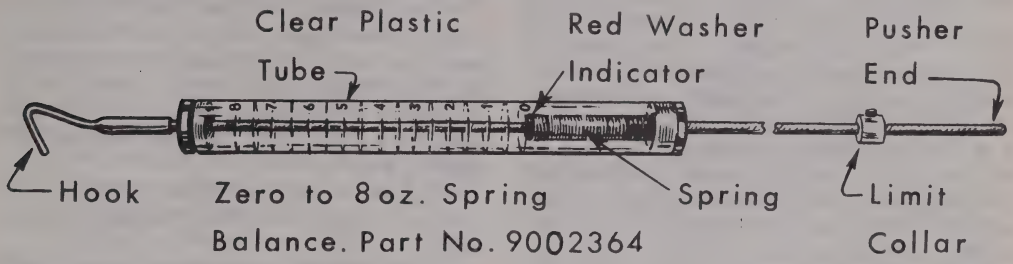
Takeup Motor torque requirements differ on PS, PS–1 and PES Lodestars depending upon whether these models have the "Alnico 5" Metal Magnet or the Ceramic Magnet in the Takeup Motor Clutch and Magnet Assembly, and whether they have the Overrunning Clutch on the High Speed Motor, as indicated in the table below.

	With Metal Magnet and Overrunning Clutch	With Metal Magnet but without Overrunning Clutch	With Ceramic Magnet and without Overrunning Clutch
Low torque	3 1/2 In. –Oz.	3 1/2 In. –Oz.	3 In. –Oz.
High torque	8 1/2 In. –Oz.	8 1/2 In. –Oz.	7 In. –Oz.

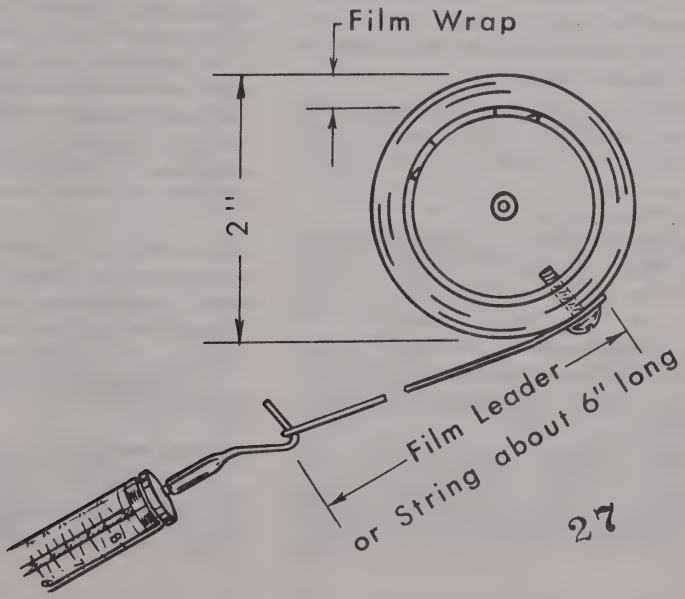
The above readings must be taken while the Takeup Motor is allowed to wind the Leader slowly onto the Special Magazine Core.

USE OF SPRING BALANCE, PART NO. 9002364, FOR ADJUSTING TAKE-UP MOTOR TORQUE IN RECORDAK LODESTAR READERS

Spring Balance 9002364 is a precision instrument for making torque and drag measurements in Recordak equipment. It has a calibrated range of from 0 to 8 ounces, but can be used for measurements up to 8 1/2 ounces.



To use this Spring Balance for Lodestar Take-Up Motor Torque measurements, a special Magazine Core, which normally has a diameter of about 1 1/2", must be increased to a diameter of 2". With this core mounted on the Take-up Motor Clutch, torque measurements can then be read directly in inch-ounces, since the Magazine Core will have a radius of one inch. The special Magazine Core is easily made by wrapping film around it until its diameter is increased to two inches. Then drill (No. 33) and tap through the film wraps and into the Core for a 6-32 Screw, to hold the film in place. A 6" length of film leader or string can be fastened by means of the Screw, as illustrated below.



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After the Takeup Motor Resistor has been adjusted, make a thorough operational check to be certain that the Takeup Motor is providing workable film tensions. Further adjustment may be necessary if it is found that jams are being caused by too much or too little Takeup torque.

21. Motor Control Reactor

The Motor Control Reactor is part of the Motor Control Unit Assembly (fig. 5, item 1). The Reactor should be adjusted so that there is an air gap of approximately .015" between the fixed laminations of the Reactor and the free end of the Reactor Armature. The size of this air gap is important because it determines how the film driving mechanism will respond to movement of the Motor Control Lever (fig. 1, item 10). If the air gap is too great, the effective controlling range of the Reactor will have been passed, with the result that the rate of film speed will change very little as the Control Lever moves through its low speed range. If there is no air gap, control of film speed may become erratic and ineffective in the low speed range. In either case, control of film movement in either direction will be unsatisfactory unless an air gap of approximately .015" is maintained. To adjust the air-gap between the Reactor and the free end of the Armature to .015", proceed as follows:

a. Remove the Screen (fig. 1, item 4).

b. Remove knobs from the Focusing Arm (fig. 1, item 8) and the Motor Control Lever (fig. 1, item 10) by removing an Allen screw threaded into each knob from the underside. The knobs will then slide off.

c. Remove the 3 screws which mount the Name and Data Plate (fig. 1, item 5) to the Name and Data Plate Bracket, and pivot the Name and Data Plate from its bracket.

d. Remove 2 screws which mount the Motor Control Unit Assembly (fig. 5, item 1) to the Name & Data Plate Bracket and release the Control Unit Assembly.

e. With the Motor Control Lever in its neutral position, loosen 2 long screws which secure the Reactor in the Motor Control Unit Frame. Adjust the Reactor position so that the gap at the free end of the armature is .015". Tighten the screws securely.

f. Reassemble the Motor Control Unit, Name & Data Plate, Motor Control Lever and Focusing Arm Knobs, and Screen.

g. Readjust the Low Speed Adjusting Potentiometer.

22. Low Speed Adjusting Potentiometer

The adjustment of the Low Speed Adjusting Potentiometer (fig. 4, item 10) determines the initial film movement speed when the Motor Control Lever (fig. 1, item 10) is moved from its neutral position and closes the Low Speed Motor contacts. Make this adjustment as follows:

a. Remove the Film Chamber Cover (fig. 1, item 11) and the Film Chamber (fig. 2, item 2).

b. Connect the reader to a power supply and position a magazine in the Magazine Cavity (fig. 1, item 2).

c. Advance film into the reader until film movement is apparent on the Screen (fig. 1, item 4).

d. Clamp the Motor Control Lever (fig. 1, item 10) at the upper limit of its Low Speed Advance range. Turn the slotted Potentiometer Adjusting Shaft as required to obtain a film movement speed of 5 to 8 feet per minute.

e. Check the film movement speed at the upper limit of the Low Speed Rewind* range. This should also be 5 to 8 feet per minute.

Note. Whenever film is moving in the Rewind direction while the Film Chamber is out of the reader, care should be taken not to damage or snag the film.

f. Compare the film movement characteristics in the Low Speed Advance range with those in the Low Speed Rewind range. If they are not reasonably similar, readjust the Potentiometer and/or the Motor Control Switch contacts to balance out the differences.

g. Reassemble the Film Chamber and Film Chamber Cover.

23. Projection Lamp Transformer

The reader has been designed to operate on a 117-volt power source. Since a voltage rating of this kind implies a variation of plus

or minus 10%, a Projection Lamp Transformer (fig. 7, item 7) has been provided with a primary tapped for line voltages of 105 to 130, in 5-volt steps, so that line voltage variations within this range may be compensated for. With the transformer adjusted to the line voltage being used, the output, *with the lamp on,* will be approximately 29.0 volts. Increasing the lamp voltage beyond this value will materially shorten the life of the lamp. To adjust the transformer correctly for the line voltage to be used, proceed as follows:

a. Check the supply line voltage with a voltmeter. The voltage should be between 105 volts and 130 volts.

b. Disconnect the reader Power Cord, turn the reader over onto its right side, and remove the Bottom Cover.

c. Check the Transformer Terminal Strip Marker (fig. 7, item 6) which is mounted on the underside of the mirror well between the Projection Lamp Transformer and the Low Speed Motor (fig. 7, item 8), to see to which terminal wire #18 is connected. The wires from the primary of the transformer and the terminals on the terminal strip are marked 105, 110, 115, 120, 125, and 130.

d. If the wire marked #18 is not connected to the terminal which most nearly agrees with the measured line voltage, it should be changed to a more appropriate terminal. To do this, grasp the taper tab receptacle with sharp-nosed pliers and pull straight away from the terminal. The pliers should also be used to push the receptacle onto the new terminal. Do not disconnect the wire by pulling on the wire itself.

Example:

Line voltage measures	
114 volts	Attach wire #18 to transformer strip terminal marked 115.

e. Replace the Bottom Cover and return the reader to its normal operating position.

24. Mechanism Plate

The Mechanism Plate may shift on its mounting brackets during shipment or other severe handling operations. Such a shift can be detected by an examination of the position of the Magazine Cavity (fig. 1, item 2) in the cabinet opening. If the cavity has pulled away from the cabinet opening or appears to be too high or low, it can be repositioned as follows:

a. Remove Screen and Rear Cover.

b. Loosen all of the Mechanism Plate Mounting Screws except the one at the rear left-hand corner. In order to loosen the lower left-hand screw, a locknut under the Mounting Bracket must be loosened first.

c. Pivot the Mechanism Plate back into position, and retighten its mounting screws.

d. A small amount of vertical adjustment can be obtained by loosening the screw in the side of the cabinet directly in front of the cavity and turning the front left-hand Mechanism Plate Mounting Screw. Tighten locknut and cabinet screw after making this adjustment.

Note. Before making any optical adjustment, be certain that the Small Mirror (fig. 12, item 14) has not been misaligned by improper adjustment.

25. Focus

Normally, no focus adjustments will be required. Should the occasion arise, however, proceed as follows:

a. Place a loaded magazine in the cavity and advance film until an image appears on the screen which will be suitable for checking focus over the entire screen area. Rotate the image until the edges of the film gate are parallel with the top and bottom edges of the screen.

b. If equal focus does not prevail at the top and bottom of the screen, remove the rear cover and loosen both Prism Bearing Arms (fig. 13, items 2 and 9) and the Prism Drive Chain (fig. 13, item 5).

c. Loosen the Prism Bearing Support Clamping Screw (Fig. 13, Item 12) and raise or lower the large end of the Prism Mount Assembly (fig. 13, item 4) by turning the Prism Bearing Support Adjusting Screw (fig. 13, item 11). When top-to-bottom focus has been equalized, tighten the clamping screw, readjust both bearing arms, and tighten the chain.

d. If the focus is not equal at the sides of the screen, remove the pins which locate the prism bearing support assembly on the mechanism plate. In order to remove the locating pins, take out the Prism Mount Assembly (fig. 13, item 4) and the prism bearing support assembly.

e. After the pins have been removed, replace the support assembly on the mechanism plate and reassemble its mounting screws and washers, but do not tighten. Reassemble the prism mount assembly, but do not tighten the chain.

f. Shift the prism bearing support assembly to the right or left on the mechanism plate until focus is equal on both sides of the screen.

g. Tighten the prism bearing support assembly mounting screws and repin the assembly to the mechanism plate. The hole size for the pins is .078.

h. Tighten the prism drive chain.

26. Image Wander

a. Place a full magazine in the cavity.

b. Observe the edges of the gate image whenever they are parallel with the edges of the screen as the Prism Rotating Knob (fig. 1, item 1) is turned through its full range.

c. If the amount of gate image showing at any horizontal or vertical position does not vary by more than .500, no adjustment is necessary.

d. If the deviation is greater than .500, add tape shims to the mechanism plate directly below the small end of the Prism Mount Assembly (fig. 13, item 4) until image wander is not more than .500. To add tape shims, remove the Front Prism Bearing Arm Assembly (fig. 13, item 2), loosen the Prism Drive Chain (fig. 13, item 5), and pivot the Rear Prism Bearing Arm Assembly (fig. 13, item 9) out of the way. This will permit the prism mount assembly to be lifted and moved to the rear so that tape shims may be applied. One thickness of tape will shift the gate image approximately .230 on the screen.

e. Recheck overall focus and adjust the large end of the prism mount assembly if necessary.

f. Reassemble and adjust the front bearing arm assembly, rear bearing arm assembly, and the prism drive chain.

27. Keystoning

Place a full magazine in the cavity, advance film into the reader, and center a rectangular image on the screen. Choose an image having a length and width of approximately 10 inches and rotate the image if necessary so that:

(1) Measurements listed below can be made reasonably close to the screen edges.

(2) The tolerance will apply to measurements made over 10-inch lengths.

a. Measure horizontally across the rectangular image near the top and bottom edges of the screen. If the two measurements are unequal by more than .100, remove both locating pins, loosen both large mirror mount screws and tilt the Large Mirror Mount (fig. 12, item 16) upwards or downwards as required to increase or decrease the top measurement to compare more closely with the bottom measurement. Tighten the screws and repin. Hole size for the pins is .078. Recheck image centering and adjust small mirror as required. (See 28 below.)

b. Measure vertically across the rectangular image near the right and left-hand sides of the screen. If the two measurements are unequal by more than .100, remove the two roll pins which locate the Mirrors Mounting Bracket (fig. 12, item 9) on the mechanism plate. Loosen the 4 Mirrors Mounting Bracket Screws (fig. 12, item 10) and pivot the entire mirror mounts and bracket assembly as required to correct the side-to-side keystoning. Care should be taken not to move the assembly forward or backward on the mechanism plate far enough to materially affect magnification. Tighten the screws.

c. Recheck the magnification. Correct if necessary without changing the angle of the mirrors (fig. 12, items 14 and 15) with respect to the screen.

d. If necessary, repin the assembly to the mechanism plate. Drill new holes (.093 plus or minus .002) and use the pins removed in *b* above.

28. Image Centering

Rotate the prism until the images of the top and bottom edges of the film gate are parallel with the sides of the screen.

a. Center the top and bottom edges of the film gate image with respect to the sides of the screen by turning the 3 Mirror Adjusting Screws (fig. 12, item 13) equal amounts. This will move the film gate image side-to-side on the screen, depending on the direction in which the adjusting screws are turned.

b. Rotate the prism through its full range and observe the amount of gate image showing along the screen edges. If this amount does not vary by more than .500, image centering is within tolerance. If the gate edge image varies by more than .500 as the prism is rotated, readjust the mirror as required to bring image centering within tolerance.

29. Magnification

Pull a small amount of film out of a magazine and measure the length or width of a suitable document image. If this is not convenient, scribe a line .500 long on the film. Rewind the film into the magazine, insert the magazine in the cavity, and advance film into the reader until the measured document image or the scribed line is centered on the screen.

a. Measure the known document image dimension on the screen or the screen image length of the scribed line and calculate the magnification. The reader magnification should be 23:1 plus or minus 1%.

b. If the calculated magnification is not acceptable, remove the roll pins which locate the Mirrors Mounting Bracket (fig. 12, item 9) on the mechanism plate. Loosen the 4 Mirrors Mounting Bracket Screws (fig. 12, item 10) and move the mirror mounts and bracket assembly forward or backward on the mechanism plate as required to correct the magnification error. Be careful not to change the angle at which the assembly rests with respect to the screen in order not to introduce keystoning. Tighten the screws when the correct location of the mirror mounts and bracket assembly has been obtained.

c. If necessary, drill two .093 plus or minus .002 holes and use the pins removed in *b* above to repin the bracket to the meahanism plate.

30. Prism Drive Chain

The prism drive sprocket bracket should be adjusted so the Prism Drive Chain (fig. 13, item 5) is tight, but not so tight that it places undue strain on the Prism Mount Assembly (fig. 13, item 4) or interferes with the smooth rotation and focusing movement of the prism mount. To adjust chain tension, proceed as follows:

a. Remove the rear cover and screen.

b. Loosen the Prism Rotating Sprocket Assembly Mounting Screw (fig. 13, item 15).

c. Pivot the prism rotating sprocket bracket assembly on the Sprocket Bracket Stud (fig. 13, item 8) as required to obtain optimum chain tension. Tighten the mounting screw.

d. Replace the screen and rear cover.

31. Front Prism Bearing Arm Assembly

The Front Prism Bearing Arm Assembly (fig. 13, item 2) holds the Prism Mount Assembly (fig. 13, item 4) downward to keep it engaged with the focusing lever and to the left to hold the prism mount against the vertical support tab which has been formed up from the mechanism plate. To adjust this arm correctly—

a. Remove the rear cover and screen.

b. Loosen the 2 Front Prism Bearing Arm Mounting screws (fig. 13, item 3) and move the arm right or left as required to hold the prism mount securely and to permit it to rotate freely. Tighten the mounting screws.

c. Replace the screen and rear cover.

32. Rear Prism Bearing Army Assembly

The Rear Prism Bearing Arm Assembly (fig. 13, item 9) holds the Prism Mount Assembly (fig. 13, item 4) in the Prism Bearing Bracket Assembly (fig. 13, item 10). This bearing arm is adjusted as follows:

a. Remove the rear cover and screen.

b. Loosen both Rear Prism Bearing Assembly Mounting Screws (fig. 13, item 13).

c. Pivot the rear bearing arm on its lower mounting screw so it holds the prism mount securely in the bearing bracket. Do not adjust the arm so tightly against the prism mount that the mount will not rotate freely. Tighten the mounting screws.

d. Replace the screen and rear cover.

33. Image Rotation

The total amount of image rotation will exceed 270° by a small amount. If this excess is not approximately equal at each end of the rotating knob travel, loosen the setscrew in the knob and reposition the knob on the control shaft so the overtravel will be equalized.

D. Lubrication

1. General

a. Carefully follow the lubrication instructions and observe the recommended periods of lubrication. Utmost cleanliness should be observed at all times, as dust and dirt particles will contaminate lubricants. In cases where lint or paper dust may have worked into the lubricant, the parts should be thoroughly cleaned before relubrication.

b. After lubrication, always operate the mechanism to distribute the lubricant uniformly to all moving parts. It is important to remove any excess lubricant with a clean cloth. *Do not overlubricate.*

c. Do not allow lubricant to come in contact with rubber, electrical insulation, glass surfaces, painted surfaces, film or surfaces over which film or documents travel.

2. Lubrication List

Item	Assy/part name	Qty.	Assy/part No.	Fig.	Lubrication	Method and point of lubrication	Lubrication interval
1	Low speed Drive Motor.	1	----------	7	EK–J	Gearbox—Fill as required ___	Before reassembly at overhaul.
2	High Speed Drive Motor	1	----------	7	EK–J	Gearbox—Fill as required ___	Before reassembly at overhaul.
3	Takeup Motor ____	1	----------	7	Sunvis 931	Compo. Bearings—1 drop ___	Before reassembly at overhaul.
4	Lamp Cooling Fan Motor.	1	----------	7	Sunvis 931	Compo. Bearings—1 drop ___	Before reassembly at overhaul.
5	Film Cooling Fan Motor.	1	----------	7	Sunvis 931	Compo. Bearings—1 drop ___	Before reassembly at overhaul.
6	Clutch Sprocket Assembly.	1	----------	7	Sunvis 931	Compo. Bearings—1 drop ___	As required.
6a	Clutch Sprocket Assembly.	1	----------	7	Unitemp	Needle Bearing—Fill—remove excess.	Before reassembly at overhaul.
					None	Clutch Face—Do not lubricate, cerisin wax impregnated at Kodak.	
7	Clutch Solenoid ____	1	----------	___	Unitemp with 10% Molycote.	Light coat where solenoid plunger contacts sprocket.	As required.
8	Drag Shoe Retainer.	2	----------	7		Light coat where retainers and switch actuator contact. ***Caution*: do not lubricate (carbon) Drag Shoe.**	As required.
9	Projection Lens Complete Assy.	1	----------	5	Dixon Slip Stick	Light coat where lens contacts plate and support.	As required.
10	Focusing Arm and Stud Assy.	1	----------	1	Unitemp	Light coat on Stud and spider spring contact point.	Before reassembly at overhaul.
11	Focusing Lever ___	1	----------	5	Unitemp	Light coat on contact points.	Before reassembly at overhaul.
12	Solenoid Drag Link.	1	----------	8	Unitemp	Light coat at contact points	As required.
13	Pressure Roller Arm Stud.	1	----------	8	Unitemp	Light coat ----------	Before reassembly at overhaul.
14	Interlock Blade Push Rod.	1	----------	8	Dixon Slip Stick	Light coat ----------	Before reassembly at overhaul.
15	Power Failure Locknut Lever.	1	----------	8	Dixon Slip Stick	Light coat ----------	Before reassembly at overhaul.
16	Magazine Locating Switch Link.	1	----------	3	Dixon Slip Stick	Light coat ----------	Before reassembly at overhaul.

Item	Assy/part name	Qty.	Assy/part No.	Fig.	Lubrication	Method and point of lubrication	Lubrication interval
17	Motor Control Lever Assy.	1	--------	--	Unitemp	Light coat on pivot studs and actuator shaft.	Before reassembly at overhaul.
18	Interlock Blade --	1	--------	3	Unitemp with 10% Molycote.	Light coat at pivot points --	Before reassembly at overhaul.
19	Magazine Cavity --	1	--------	1	Lubribond	Light coat where lower edge of cavity forms a retainer for the magazine.	As required.
20	Film Chamber (Festoon Chamber and Cover).	1	--------	1,2	Simonize Paste Floor Wax.	Light coat on both surfaces.	As required.

3. Key to Lubricants

EK–J ---------- EK–J is equivalent to Tidewater Oil Co. Alpyron #30 or Davis Howland Co. DSL 1002. It is a fibrous, spongy, sodium base grease with an oil of 100–300 S.U.S. at 100°F. The melting point is 300° minimum with a work penetration of 240–270. Any sodium base grease of this consistency may be substituted.

Sunvis 931 ----- Sunvis 931 oil is EK–1300 oil. Any heavy medium turbine oil inhibited and with added detergents, SAE #20 may be substituted.

Unitemp ------ Texas Uni-Temp Grease may be substituted with Norma Hoffman 66, Aero Shell 11 or Esso Beacon 325.

Molycote ------ Molycote is recommended, although Acheson Oildag may be substituted.

Lubribond ----- Lubribond is a product of the Electrofilm Corporation, North Hollywood, Calif.

Dixon Slip Stick Product of Joseph Dixon Crucible Co., Jersey City, N.J. A good quality graphite lubricant may be substituted.

Section VI. DISASSEMBLY

A. Removal of External Parts

1. Screen

Release the Rear Cover Stud and remove the Rear Cover. Place one hand on the front surface of the Screen (fig. 1, item 4) and one hand on the rear surface. Lift the screen until the lower edge can be disengaged from its channel. Swing the lower edge to the rear so it can be lowered far enough to disengage the top edge. When both edges (top and bottom) of the screen are free, lift the screen out of the cabinet.

2. Film Chamber Cover

Release the Film Chamber Cover Stud (fig. 1, item 12). Slide the Film Chamber Cover (fig. 1, item 11) forward until it can be raised and removed from the reader. Whenever this cover is being removed it should be lifted slightly as soon as possible to minimize scratching of the under surface.

3. Film Chamber

Remove the Film Chamber Cover. Remove the Film Chamber Mounting Screw (fig. 2, item 3), lift the front end of the Film Chamber far enough to clear the cabinet, and pull it forward until it can be completely removed.

4. Name and Data Plate

a. Remove the Rear Cover and Screen (fig. 1, item 4).

b. Remove the socket head setscrews which fasten the knobs to the Focusing Arm (fig. 1, item 8) and the Motor Control Lever (fig. 1, item 10). The setscrews are threaded into the arm and lever from the bottom. The knobs will slide off after the screws have been removed.

c. Remove the 3 Name and Data Plate Mounting Screws, taking care not to lose the speed Nut into which the upper mounting screw is threaded. Pull the plate forward until it is free of the reader cabinet.

5. Bottom Cover

a. Pad the surface on which the reader rests with cloth or other suitable material to prevent damage to the finish and tip the reader on its right side.

b. Remove the 4 rubber feet and 4 spacers by removing their mounting screws.

c. Disassemble the Strain Relief Bracket from the Bottom Cover by removing 2 mounting screws.

d. Remove 2 Bottom Cover Mounting Screws located on either side of the cover and approximately half-way between the front and rear of the reader. The Bottom Cover can now be completely detached from the reader.

B. Removal of Parts and Assemblies From Top of Mechanism Plate

1. Film Guides

a. Remove the Rear Cover and Screen (fig. 1, item 4).

b. To remove the Upper Film Guide (fig. 5, item 4) insert a finger in the opening at the Film Gate Area (fig. 6, item 10) and lift the Upper Guide until it unsnaps from the 3 Film Guide Springs (fig. 6, item 9).

c. To remove the Lower Film Guide (fig. 5, item 5), tip the reader on its right side, using cloth or other suitable material as padding to protect the finish.

(1) Remove the Bottom Cover.

(2) Remove the Large Air Duct (fig. 7, item 2).

(3) Remove the 4 Lower Film Guide Mounting Screws and lockwashers which fasten the Lower Film Guide to the Mechanism Plate. The screws are threaded into the Lower Film Guide from the underside of the plate.

(4) Grasp the Lower Film Guide on both sides of the Film Gate and lift the guide,

with its locating pin, from the Mechanism Plate.

2. Small Air Duct

To disassemble the Small Air Duct (fig. 5, item 6), first remove the Rear Cover and Screen (fig. 1, item 4). Remove the screw which fastens the duct to the Mechanism Plate and raise the left end of the duct until the tab on the right end can be released from the Mechanism Plate.

3. Motor Control Unit Assembly

a. Remove the Rear Cover and Screen (fig. 1, item 4).

b. Remove the Film Chamber Cover (fig. 1, item 11), the Film Chamber (fig. 2, item 2), and the knobs from the Focusing Arm (fig. 1, item 8) and the Motor Control Lever (fig. 1, item 10).

c. Remove the 3 mounting screws from the Name and Data Plate (fig. 1, item 5) and pull the plate away from the Name and Data Plate Mounting Bracket far enough so that the right end will drop down and make the Motor Control Assembly Mounting Screws accessible.

d. When the Name and Data Plate is pulled out of the way, 4 screws become accessible in the right side of the Name and Data Plate Mounting Bracket. The lower pair of screws fasten the Motor Control Unit Assembly to the Bracket. Removal of this lower pair of screws and lockwashers, plus the disassembly of the Motor Control Switch Cover (fig. 5, item 2), permits adjustment of the Motor Control Switch contacts and the Motor Control Reactor.

e. If the Motor Control Unit Assembly must be completely removed from the reader, trace the wires from the assembly to their respective terminal strips, disconnect them and pull them out of the wire ties so that the entire assembly can be removed.

4. Focusing Lever

a. Remove the Rear cover and tip the reader on its right side, using cloth or other suitable material for padding to prevent damage to the finish.

b. Remove the Bottom Cover, Large Air Duct (fig. 7, item 2), Upper Film Guide (fig. 5, item 4), Lower Film Guide (fig. 5, item 5), and the Projection Lens (fig. 5, item 9).

c. Loosen the screw which fastens the Small Air Duct (fig. 5, item 6) and raise the left end of the duct off of the Mechanism Plate.

d. Lift the Focusing Lever (fig. 5, item 3) off of its Pivot Stud and slide the lever toward the rear until it is disengaged from the Focusing Arm (fig. 1, item 8). The lever may now be completely removed from the reader.

5. Cavity Assembly

a. Remove the Rear Cover and Screen (fig. 1, item 4).

b. Disconnect and remove the Power Failure Lockout Lever (fig. 8, item 8), the Power Failure Lockout Lever Spring (fig. 8, item 3), the Solenoid Drag Link (fig. 8, item 7), and the Interlock Blade Push Rod (fig. 8, item 6).

c. Remove 3 screws which fasten the cavity to the Mechanism Plate. One short screw and lockwasher is located at the front left corner of the cavity, another short screw and lockwasher is at the rear left corner, and the third is a long screw on the top of the cavity between the shoulders which guide the Solenoid Drag Link.

d. The Cavity Assembly can now be removed far enough from the Mechanism Plate to adjust the Magazine Locating Spring (fig. 8, item 2) or to make other repairs. If the assembly must be removed completely, trace the wires from the cavity to their respective terminal strips, disconnect them, and pull them out of the wire tie. The cavity will then be entirely free of the reader.

6. Illumination Assembly

a. Remove the Rear Cover, Screen (fig. 1, item 4), and Lamphouse Cover (fig. 5, item 7).

b. Tip the reader on its right side, padding the surface on which the cabinet will rest so the finish will not be marred. Remove the Bottom Cover.

c. Disconnect wires No. 39 and No. 40 from the Main Terminal Strip (underside) and pull them out of the wire tie.

d. Remove the screw and flat washer which clamp the front of the Illumination Assembly to the Lamphouse Support Plate. This screw is located inside the Lamphouse (fig. 5, item 8) directly in front of and below the reflector.

e. Lift the front of the Illumination Assembly toward the top of the Lamphouse and pull it to the front as much as possible at the same time. This will disengage the rear tip of the Illumination Assembly from its recess between the Mechanism Plate and the Lower Film Guide (fig. 5, item 5).

f. Hold the assembly in this position and withdraw it from the Lamphouse. It may be necessary to guide the wires through the hole in the Lamphouse.

C. Removal of Parts and Assemblies From Bottom of Mechanism Plate

1. Large Air Duct

a. Tip the reader onto its right side, padding the supporting surface with cloth or other material to prevent damage to the finish.

b. Remove the Bottom Cover.

c. Remove 2 screws and lockwashers which fasten the Large Air Duct (fig. 7, item 2) to the Film Cooling Fan Housing. The screws are located just below the Film Cooling Fan Motor (fig. 7, item 3).

d. The duct can now be lifted slightly and withdrawn through the bottom of the reader.

2. Film Cooling Filter

a. Tip the reader on its right side, padding the surface on which it rests with some material which will protect the finish.

b. Remove the Bottom Cover and Large Air Duct (fig. 7, item 2).

c. Unhook one end of the long spring which holds the Film Cooling Filter (fig. 7, item 1) in the Film Cooling Fan Housing and the filter will drop out.

3. Projection Lamp Transformer

a. Remove the Rear Cover and tip the reader onto its right side, using a cloth or other suitable material for padding to prevent damage to the finish.

b. Remove the Bottom Cover.

c. Remove 4 screws from the top of the Mechanism Plate while supporting the Projection Lamp Transformer (fig. 7, item 7) with one hand. The screws are located in the Mechanism Plate to the right of the mirror well and just in front of the Mirror Support Bracket (fig. 5, item 16).

d. Disconnect the wires from the Transformer Terminal Strip (fig. 7, item 6), unfasten one wire tie, and remove the Transformer Assembly.

4. Low Speed Motor and Sprocket Assembly

a. Remove the Rear Cover and tip the reader onto its right side, using a cloth or other material as padding to prevent damage to the finish.

b. Remove the Bottom Cover.

c. Disconnect Low Speed Motor leads No. 11, 12, and 15 from the Motor Terminal Strip (fig. 7, item 5). Unfasten the wire tie and free these wires from the others.

d. Support the Low Speed Motor (fig. 7, item 8), and remove both Low Speed Motor and Sprocket Assembly Mounting Screws (fig. 6, item 15) and lockwashers. These screws are accessible through the top of the mirror well, in the Mechanism Plate.

e. The Low Speed Motor and Sprocket Assembly may now be removed from the reader.

5. High Speed Motor and Clutch Assembly

a. Remove the Rear Cover and tip the reader onto its right side, using something to keep the cabinet finish from being damaged.

b. Remove the Bottom Cover.

c. Disconnect High Speed Motor leads No. 9, 10, and 38 from the Motor Terminal Strip (fig. 7, item 5). Unfasten the wire tie and take out these three wires.

d. Disconnect wires No. 20 and 16 from the Motor Terminal Strip and pull them out of the wire ties. These are the two white wires which go to the Clutch Solenoid.

e. Unhook the Power Failure Lockout Spring (fig. 8, item 3), disassemble the Power Failure Lockout Lever (fig. 8, item 8), and remove the Drive Roller (fig. 8, item 9) by

loosening the expansion head screw in the end of the Drive Roller Shaft.

f. Remove the Low Speed Motor and Sprocket Assembly.

g. Support the High Speed Motor (Fig. 7, Item 11) and remove the 2 High Speed Motor Mounting Screws (fig. 5, item 12) and lockwashers.

h. Withdraw the High Speed Motor and Clutch Assembly from the cabinet, being careful not to dislodge the Drag Shoe Retainers (fig. 7, item 13).

6. Takeup Motor, Bracket, and Protection Switch Assembly

a. Remove the Rear Cover and Screen. Tip the reader onto its right side, using cloth or other suitable material as padding to prevent damage to the cabinet finish.

b. Remove the Bottom Cover.

c. Unfasten the wire tie and release wires No. 1, 7, 14, 41, and 42. Disconnect these leads from the Motor Terminal Strip (fig. 7, item 5).

d. Remove the 3 Takeup Motor Mounting Screws, lockwashers, and flat washers (fig. 5, item 13) which fasten the Takeup Motor, Bracket, and Protection Switch Assembly to the Mechanism Plate. Pull the assembly from the Mechanism Plate far enough to disconnect wires No. 3 and 37 from the Interlock Solenoid Hold Switch (fig. 7, item 16). The locating pins may or may not remain in the Takeup Motor Mounting Bracket.

e. The entire assembly may now be removed from the reader.

7. Lamp Cooling Fan

a. Tip the reader on its right side, using suitable material for padding to prevent damage to the cabinet finish.

b. Remove the Bottom Cover.

c. Remove the 2 screws which fasten the Lamp Cooling Fan Motor (fig. 7, item 19) to the bottom of the Lamphouse (fig. 7, item 18). Be careful not to lose the nuts and lockwashers into which the Fan Motor Mounting Screws are threaded.

d. The Motor and Fan can now be removed far enough to adjust or replace the fan. If the motor must be completely disassembled from the reader, untie fan leads No. 37 and 38 and disconnect them from the Main Terminal Strip (bottom side).

8. Mechanism Assembly

a. Remove the Rear Cover, Screen, Film Chamber Cover, Film Chamber, and Name and Data Plate.

b. Tip the reader on its right side using a cloth or other material as padding to prevent damage to the cabinet finish. Remove the Bottom Cover.

c. Remove the Strain Relief Bracket from the Bottom Cover and pull the Power Cord all the way out of the hole in the Bottom Cover.

d. Disassemble the Mechanism Support Brackets from the Mechanism Plate and from the reader cabinet. These are the L-shaped brackets which are attached to the front end of the Mechanism Plate and to the flanges on the bottom of the cabinet.

e. Remove the buttonhead screw, lockwasher, and nut at the rear left corner, rear right corner, and front right corner of the Mechanism Plate. These screws fasten the Mechanism Assembly to the cabinet.

f. Tip the reader back to its normal upright position and remove the button head screw, lockwasher, and locknut that fastens the Mechanism Plate Support Bar to the bracket welded to the side of the cabinet. This bar is located at the left front corner of the Mechanism Plate. Also remove the screw which is threaded into the Support Bar from the left side of the cabinet.

g. Slide the Mechanism Assembly out through the front of the cabinet.

D. Removal of Image Rotation Assemblies

1. Prism Rotating Knob Assembly

The Prism Rotating Knob Assembly (fig. 1, item 1) consists of a knob, setscrew, and roll pin. To remove the assembly, loosen the setscrew and withdraw the knob from the end of the Prism Control Shaft (fig. 12, item 1).

2. Prism Mount Assembly

The Prism Mount Assembly (fig. 13, item 4) is made up of a tubular mount within

which are assembled the projection lens, prism, compensating lens, and other parts required for the location and alignment of these optical components. Rotation of this assembly results in the rotation of document images on the reader screen.

a. Remove the rear cover and screen from the reader cabinet.

b. Loosen the Prism Rotating Sprocket Bracket Assembly Mounting Screw (fig. 13, item 15) and pivot the bracket assembly to the right to loosen the Prism Drive Chain (fig. 13, item 5).

c. Remove both Front Prism Bearing Arm Assembly Mounting Screws (fig. 13, item 3) and flat washers. Lift out the Front Prism Bearing Arm Assembly (fig. 13, item 2).

d. Remove the Upper Rear Prism Bearing Arm Assembly Mounting Screw (fig. 13, item 13) and lockwasher. Loosen the lower mounting screw and pivot the Rear Prism Bearing Arm Assembly (fig. 13, item 9) upward and to the right.

e. Disengage the prism drive chain from the pin which projects from the barrel of the prism mount assembly. Lift the assembly to disengage it from the focusing lever, slide it to the rear until it is free of the chain loop, and then remove it from the reader.

Caution: **Further disassembly or readjustment of the components within the prism mount assembly should not be attempted since this is a preset, factory-adjusted, sealed unit.**

3. Prism Bearing Support Assembly

The essential components of this assembly are the Rear Prism Bearing Arm (fig. 13, item 9) and the Prism Bearing Bracket (fig. 13, item 10) mounted on the prism bearing support which is the base for the assembly. The assembly supports the rear end of the Prism Mount Assembly (fig. 13, item 4) in a manner which allows prism rotation, and provides horizontal and vertical adjustment for squaring the prism mount assembly with the film gate. To remove the prism bearing support assembly from the reader, proceed as follows:

a. Measure the distance between the bottom of the mirror well and the top of the prism mount assembly at the large end. Record this dimension on the mechanism plate at the left of the mirror well.

b. Remove the Prism Mount Assembly.

c. Remove both Prism Bearing Support Assembly Mounting Screws (fig. 13, item 14) and washers, lift the prism bearing support assembly off of its locating pins and remove the locating pins.

d. Do not change the adjustment of the prism bearing support assembly unless further disassembly is necessary.

4. Prism Drive Sprocket Bracket Assembly

The prism drive sprocket bracket assembly consists of—

(1) Prism Control Shaft—fig. 12, item 1
(1) Sprocket Assembly—fig. 13, item 7
(1) Prism Drive Chain—fig. 13, item 5
(1) Prism Drive Sprocket Bracket
(1) Prism Drive Sprocket Spacer
(2) Prism Control Shaft Rear Bearings

The assembly is mounted on the front wall of the mirror well in the mechanism plate, and it pivots on the Drive Sprocket Bracket Stud (fig. 13, item 8) to provide chain tension adjustment. To remove the prism drive sprocket bracket assembly from the reader, proceed as follows:

a. Turn the Prism Rotating Knob (fig. 1, item 1) counterclockwise as far as possible. Then disassemble the knob from the prism control shaft.

b. Remove the rear cover and screen.

c. Mark the Prism Mount Assembly (fig. 12, item 4) so it can be returned to its original position for reassembly.

d. Remove the prism control shaft retaining ring. This ring is located on the prism control shaft directly in back of the bearing in the name plate support bracket.

e. Open one of the links in the prism drive chain and disengage the chain from the prism drive sprocket.

f. Remove the Prism Rotating Sprocket Bracket Mounting Screw (fig. 13, item 15). Slide the bracket assembly to the rear, past the Prism Bearing Bracket Assembly (fig. 13, item 10) until it is clear of the Drive Sprocket

Bracket Stud (fig. 13, item 8). Then lift the assembly until it clears the Small Mirror (fig. 12, item 14) and continue to move it to the rear until the control shaft has been drawn completely through the Control Shaft Guide (fig. 13, item 1) and is free of the mechanism plate.

g. Loosen the 2 setscrews in the sprocket assembly and pull the control shaft out of the sprocket and bearings. Be certain to unthread the set screws far enough so they do not strike the edge of the undercut and raise a burr on the control shaft. Also be careful not to lose the spacer which positions the sprocket toward the rear of the cabinet. Disassembly is now complete except for the bearings in the bracket.

5. Mirror Mounts and Bracket Assembly

The main components of this assembly are—

2 Mirrors—fig. 12, items 14 and 15
2 Mirror Mounts—fig. 12, items 11 and 16
1 Mirror Mounting Bracket—fig. 12, item 9
1 Large Mirror Mount Pivot—fig. 12, item 17

The small mirror and its mount are fastened to the mirrors mounting bracket by 3 Mirror Adjusting Screws (fig. 12, item 13) each of which passes through a spring to provide adjustment for mirror alignment. The large mirror and its mount are fastened to the mirror mounting bracket by the large mirror mount pivot shaft and two adjustment locking screws. Correct adjustment of the large mirror is obtained by tilting the mirror mount on its pivot and then retaining the adjustment with the locking screws and locating pins. To remove this assembly from the reader and dismantle it, proceed as follows:

a. Remove the rear cover and screen.

b. Remove the 4 Mirrors Mounting Bracket Screws (fig. 12, item 10). The screws are threaded into 2 Tinnerman Speed Nuts which bear against the underside of the mechansim plate. Be careful not to lose the speed nuts when the screws are removed.

c. Lift the entire assembly off of the 2 pins which locate it on the mechanism plate and remove the assembly from the reader cabinet. Remove the locating pins.

d. The small mirror and its mount can be disassembled from the mirrors mounting bracket by the removal of the 3 mirror adjusting screws. Be careful not to lose the springs through which the adjusting screws pass and which lie between the mirror mount and the bracket.

e. It is not anticipated that it will be necessary to remove the large mirror mount from the mirrors mounting plate. However, if it should become necessary to do this, proceed as follows:

1. Remove 2 locating pins which are directly below the 2 screws which fasten the top of the mount to the mirrors mounting bracket.
2. Use 2 screwdrivers to pry off one of the triangular retainers from the end of the large mirror mount pivot. It is quite possible that the retainer will break during attempts to remove it, so be certain that a spare is available.
3. Remove both of the large mirror mount screws and lockwashers. Hold the mirror mount so it does not fall and damage the mirror when the second screw and lockwasher are taken out.
4. While holding the large mirror mount with one hand, withdraw the pivot to free the mirror mount.

f. To remove the large mirror from its mount, loosen the screws which fasten the Mirror Clamps (fig. 12, item 12) to the mirror mount and slide the mirror out from under the clamps.

g. To remove the small mirror, dismount the left-hand mirror clamp completely. Then loosen the screws which fasten the 2 right-hand clamps and slide the mirror to the left until it is free of the right-hand clamps.

Section VII. REASSEMBLY

A. Reassembly of Parts and Assemblies to Bottom of Mechanism Plate

1. Mechanism Assembly to Cabinet

a. Slide the Mechanism through the front of the reader cabinet and lift it up onto its supporting brackets.

b. Line up the hole in the left rear corner of the Mechanism Plate with the hole in the left rear Mechanism Plate Support Bracket and insert a button head Mechanism Assembly Mounting Screw. Reach into the back of the cabinet and attach a lockwasher and nut to this screw.

c. Install a Mechanism Assembly Mounting Screw, lockwasher, and locknut at the left front corner of the Mechanism Assembly. This button head screw is used to adjust the Mechanism Assembly up or down until the Magazine Cavity (fig. 1, item 2) is correctly aligned with the opening in the cabinet. After the correct adjustment has been obtained, the screw is locked with the lockwasher and nut which are tightened against the underside of the support bracket.

d. Install the screw which passes through the left side of the cabinet and threads into the side of the Mechanism Assembly Support Bar.

e. Install a Mechanism Assembly Mounting Screw, lockwasher, and nut at the right rear corner of the Mechanism Plate. Tighten both rear mounting screws.

f. Tip the reader onto its right side and fasten the front right corner of the assembly to its support bracket with a button head mounting screw, lockwasher, and nut.

g. Remount the Bottom Cover. Tip the reader back into an upright position.

h. Reassemble the Name and Data Plate, Film Chamber, Film Chamber Cover, Screen, and Rear Cover.

2. Lamp Cooling Fan

a. Slide the Fan and Collar Assembly onto the Fan Motor Shaft with the collar toward the motor. Locate the assembly on the shaft so that the fan will be as close to the motor as possible without interference between the fan and the body of the motor. Tighten the setscrews.

b. Place the Fan Motor against the "ears" at the bottom of the Lamphouse (fig. 7, item 18) so that the fan is inside the lamphouse. Fasten the Fan Motor in this position with 2 screws, lockwashers, and nuts. The screws pass through holes in the field assembly of the motor and in the "ears" at the bottom of the Lamphouse.

c. Connect the motor leads to terminals No. 37 and 38 on the Main Terminal Strip (bottom side) and tie them in with other wires near the strip.

d. Replace the Bottom Cover and tip the reader back into its normal operating position.

3. Takeup Motor, Bracket, and Protection Switch Assembly

a. Connect wires No. 3 and 37 to the Interlock Solenoid Hold Switch (fig. 7, item 16). See the Wiring Diagram on the Rear Cover for the correct terminals.

b. Guide the Takeup Motor, Bracket, and Protection Switch Assembly into position against the bottom of the Mechanism Plate, being careful not to dislodge the Drag Shoe Retainers (fig. 7, item 13) from their shaft. Also be certain that the retainers are positioned on their shaft so that the spring-secured end will actuate the Interlock Solenoid Hold Switch and the Motor Protection Switch (fig. 7, item 17).

c. Make certain that the 3 locating pins engage both the Mechanism Plate and the Mounting Bracket. Fasten the assembly to the plate with 3 Takeup Assembly Mounting

Screws, flat washers, and lockwashers (fig. 5, item 13).

d. Connect wires No. 1, 7, 14, 41, and 42 to the Motor Terminal Strip (fig. 7, item 5) and tie them in with the leads from the high Speed Motor (fig. 7, item 11).

e. Replace the Bottom Cover. Tip the reader back into an upright position and check the operation of the reader. If adjustments are indicated, see Adjustments.

4. High Speed Motor and Clutch Assembly

a. Maneuver the High Speed Motor and Clutch Assembly (fig. 7, item 11) against its Mounting Plate which is attached to the underside of the Mechanism Plate. Position the Drag Shoe Retainers (fig. 7, item 13) on the shaft so that the end secured by the Drag Shoe Retainer Spring (fig. 7, item 12) will actuate the Interlock Solenoid Hold Switch (fig. 7, item 16) and the Motor Protection Switch (fig. 7, item 17).

b. Fasten the Motor and Clutch Assembly to its Mounting Plate with 2 High Speed Motor Mounting Screws (fig. 5, item 12) and lockwashers. The screws thread into two tapped holes in the motor housing from the top of the Mounting Plate.

c. Place the Drive Roller (fig. 8, item 9) on its shaft and then refer to Adjustments, for information concerning the correct location of the roller. Adjust the roller as directed.

d. Reassemble the Power Failure Lockout Lever (fig. 8, item 8) and the Power Failure Lockout Lever Spring (fig. 8, item 3).

e. Connect High Speed Motor leads No. 9, 10, and 38 to their respective terminals on the Motor Terminal Strip (fig. 7, item 5). Tie these wires in with the other adjacent wires.

f. See below, and remount the Low Speed Motor and Sprocket Assembly.

g. Bring wires No. 16 and 20 from the Clutch Solenoid around the Low Speed Motor (fig. 7, item 8), tie them in with adjoining wires, and connect them to the proper terminals on the Motor Terminal Strip.

h. Reassemble the Bottom Cover, tip the reader back into an upright position, and replace the Rear Cover.

5. Low Speed Motor and Sprocket Assembly

a. Hold the Low Speed Motor and Sprocket Assembly (fig. 7, item 8) in position against its Mounting Plate, place the Drive Chain (fig. 7, item 9) around the Sprocket, and fasten the assembly to its Mounting Plate with 2 Low Speed Motor and Sprocket Assembly Mounting Screws (fig. 6, item 15).

b. Unfasten the wire tie nearest the Motor Terminal Strip (fig. 7, item 5) and tie in the Low Speed Motor leads with the other wires. Connect these leads to vacant terminals Nos. 11, 12, and 15 on the Motor Terminal Strip.

c. Replace the Bottom Cover, tip the reader back into an upright position, and reassemble the Rear Cover.

6. Projection Lamp Transformer

a. Make certain that (4) U-type Tinnerman Speed Nuts are properly located on the mounting flanges of the Projection Lamp Transformer (fig. 7, item 7), and lift the Transformer into position against the bottom of the Mechanism Plate.

b. Fasten the Transformer to the Mechanism Plate with (4) Transformer Mounting Screws which pass through the Mechanism Plate from the top and thread into the Tinnerman Nuts on the Transformer. The holes for these screws are located in the Mechanism Plate to the right of the mirror well and slightly ahead of the Mirror Support Bracket (fig. 5, item 16).

c. Connect the wires from the Transformer to the proper terminals on the Transformer Terminal Strip (fig. 7, item 6) and tie them in with the two white wires which lead to the Clutch Solenoid.

d. Replace the Bottom Cover, return the reader to its normal upright position, and replace the Screen (fig. 1, item 4) and Rear Cover.

7. Film Cooling Filter

a. Hook one end of the Film Cooling Filter Spring in the hole in the rear surface of the Film Cooling Fan Housing.

b. Place the Film Cooling Filter (fig. 7, item 1) in position on the Fan Housing. Pull

the spring across the filter and hook it into the hole in the other side of the housing.

c. Replace the Large Air Duct (fig. 7, item 2) and the Bottom Cover.

d. Return the reader to its normal operating position.

8. Large Air Duct

a. Insert the Large Air Duct (fig. 7, item 2) through the bottom of the reader and slide it onto the Film Cooling Fan Housing. The open side of the duct should be toward the side of the reader and the cut out portion should be positioned so that it will fit around the Film Cooling Fan Motor (fig. 7, item 3). Take care that the top edge of the duct does not jam against any of the wires and possibly damage the insulation.

b. Fasten the duct to the Fan Housing with 2 screws and lockwashers. The screws pass through two slots in the duct and thread into two holes in the Fan Housing, slightly below the Film Cooling Fan Motor.

c. Before tightening the mounting screws, adjust the duct as far toward the bottom of the reader as possible.

d. Replace the Bottom Cover and tip the reader back into its normal upright position.

B. Reassembly of Parts and Assemblies to the Top of the Mechanism Plate

1. Illumination Assembly

a. Hold the Illumination Assembly at the top of the Lamphouse (fig. 5, item 8) and thread the wires from the Projection Lamp Socket down into the Lamphouse and out through the small hole in the front just above the Lamp Cooling Fan.

b. Guide the Illumination Assembly down into the Lamphouse with the assembly slanted so the rear tip is toward the rear of the reader and below the front end of the assembly. It may be necessary to pull the wires through the hole in the Lamphouse as the assembly is being lowered into position.

c. When the rear tip of the Illumination Assembly is opposite the recess provided for it between the bottom of the Lower Film Guide (fig. 5, item 5) and the top of the Mechanism Plate, slide the tip into the recess. Continue to lower the front end of the assembly into the Lamphouse until it rests on the Lamphouse Support Plate.

d. Be sure that the rear tip of the assembly is resting on the Mechanism Plate and not under it. Clamp the front end of the assembly to the Lamphouse Support Plate with the screw and flat washer previously removed.

e. Thread the wires from the hole in the Lamphouse through the wire tie nearest the Main Terminal Strip (bottom side) and connect them to one of the vacant No. 39 and No. 40 terminals.

f. Replace the Bottom Cover, and return the reader to its normal operating position.

g. See Adjustments and make any necessary readjustments to the Illumination Assembly.

h. Replace the Lamphouse Cover (fig. 5, item 7), Screen (fig. 1, item 4), and the Rear Cover.

2. Cavity Assembly

a. Thread the wires through the Mechanism Plate, connect them to the Main Terminal Strip, and tie them in with adjacent wires. Some of the wires are connected to the top-side strip and some to the bottom side strip.

b. Position the Cavity Assembly (fig. 5, item 11) on the Mechanism Plate and fasten it with 3 mounting screws and lockwashers. Two short screws are used at the front left corner and the rear left corner of the cavity, and the long screw goes through the top of the cavity between the guide shoulders for the Solenoid Drag Link. Before tightening the cavity mounting screws, be certain that the Magazine Locating Switch Link is connected properly to the switch lever and that it is seated in the slot provided in the Mechanism Plate.

c. Reassemble the Power Failure Lockout Lever (fig. 8, item 8), the Power Failure Lockout Lever Spring (fig. 8, item 3), the Solenoid Drag Link (fig. 8, item 7), and the Interlock Blade Push Rod (fig. 8, item 6).

d. Replace the Rear Cover and Screen (fig. 1, item 4).

3. Focusing Lever

a. Engage the Focusing Lever (fig. 5, item 3) with the Focusing Arm (fig. 1, item 8) and the Pivot Stud.

b. Replace the Lower Film Guide (fig. 5, item 5), Upper Film Guide (fig. 5, item 4), Large Air Duct (fig. 7, item 2), and Bottom Cover. Tip the reader upright to its normal operating position.

c. Install the Projection Lens (fig. 5, item 9), and tighten the Small Air Duct (fig. 5, item 6).

d. Connect the reader to a power supply, and advance film into the reader. Check the operation of the focusing mechanism and readjust the Focus Lever Pivot Stud Adjusting Screw (fig. 5, item 15) if necessary. (See Adjustments.

e. Replace the Rear Cover.

4. Motor Control Unit Assembly

a. Thread the wires through the Mechanism Plate and connect them to the proper terminals on the Main Terminal Strip. Tie them in where necessary.

b. Check the adjustment of the Motor Control Reactor and the Motor Control Switch Contacts. (See Adjustments).

c. Fit the Motor Control Switch Cover (fig. 5, item 2) over the Motor Control Switch and fasten it with 2 Tinnerman Speed Clips.

d. Position the Motor Control Unit Assembly (fig. 5, item 1) against the Name and Data Plate Mounting Bracket so that the Motor Control Lever (fig. 1, item 10) extends through the lower slot and the Motor Control Lever Clamp (fig. 1, item 9) extends through the center slot in the bracket, directly below the Focusing Arm (fig. 1, item 8). Secure the assembly to the bracket with 2 screws passing through clearance holes in the bracket and threaded into the Control Assembly.

e. Reassemble the Name and Data Plate (fig. 1, Item 5) and attach the knobs to the Focusing Arm and Motor Control Lever.

f. Reassemble the Film Chamber (fig. 2, item 2), the Film Chamber Cover (fig. 1, item 11), the Screen (fig. 1, item 4), and the Rear Cover.

5. Small Air Duct

a. Insert the tab on the right end of the Small Air Duct (fig. 5, item 6) in the slot provided for it in the Mechanism Plate. The slot is at the right side of a rectangular opening which is slightly in front and to the right of the mirror well.

b. With the tab in its slot, lower the left end of the duct onto the Mechanism Plate and fasten it with its mounting screw and lockwasher. The mounting screw passes through the top of the duct and is threaded into a Nylon Snap Nut.

c. After the mounting screw has been tightened, check the duct to be certain that it rests firmly on the Mechanism Plate, and that it does not interfere with movement of the Focusing Lever (fig. 5, item 3).

6. Film Guides

a. Place the Lower Film Guide (fig. 5, item 5) on the Mechanism Plate with the Locating Pin in its hole in the plate. Be certain that the guide is resting on the Mechanism Plate and is not being held up from it by the baffle strip between the guide and the Projection Lens (fig. 5, item 9), the Film Guide Springs (fig. 6, item 9) not seating in their recesses, the Focusing Lever (fig. 5, item 3), the Pressure Roller Arm (fig. 8, item 12), or the triangular tip of the Illumination Bracket.

b. Thread the 2 center Lower Film Guide Mounting Screws with lockwashers into the Lower Film Guide and tighten them securely. After the screws have been tightened, back each of them off 3 to 5 degrees to release any torsional warp.

c. Thread the 2 end Lower Film Guide Mounting Screws through the Mechanism Plate into the Lower Film Guide and adjust the ends of the guide as directed in Adjustments.

d. Check the Film Gate area to be sure that the locating pin is flush with or below the Film Guide surface and that the baffle strip is pressed down out of the optical path.

e. Reassemble the Upper Film Guide (fig. 5, item 4) by placing it in position on the Lower Film Guide and pressing it down until the Film Guide Springs (fig. 6, item 9) snap

over the shoulders on the Upper Film Guide. (See Adjustments, if any further adjustments are necessary).

f. Reassemble the Large Air Duct (fig. 7, item 2) and Bottom Cover.

g. Tip the reader back into its normal position and reassemble the Screen (fig. 1, item 4) and the Rear Cover.

C. Assembly of External Parts

1. Bottom Cover

a. Stand the Bottom Cover on edge so the louvers are toward the reader and the rectangular opening lines up with the Large Air Duct (fig. 7, item 2).

b. Thread the Power Cord through the hole in the center of the cover and mount the Strain Relief Bracket on the inner surface of the cover with 2 screws.

c. Hold the Bottom Cover in position against the bottom of the cabinet and secure it with 2 Bottom Cover Screws which thread into either side of the cabinet approximately halfway between the front and rear of the reader.

d. Mount a Spacer and Rubber Foot at each corner of the Bottom Cover by means of a screw threaded through the foot and spacer into speed nuts attached to the bottom of the cabinet at the corners.

e. Tip the reader back into an upright position.

2. Name and Data Plate

a. Insert the side of the Name and Data Plate between the cabinet and the Name and Data Plate Mounting Bracket and slide the plate into position. The plate must be guided so that the Focusing Arm (fig. 1, item 8), the Motor Control Lever, Clamp (fig. 1, item 9), and the Motor Control Lever (fig. 1, item 10) will pass through the slots provided for them.

b. Assemble and tighten the 3 mounting screws, being careful that the center screw in the upper edge of the plate is properly threaded into a speed nut.

c. Assemble the knobs to the Focusing Lever and the Motor Control Lever, securing them with socket head setscrews threaded into the arm and lever.

3. Film Chamber

a. Hold the Film Chamber (fig. 2, item 2) with the cutout for the Film Guides (fig. 5, items 4 and 5) oriented to the right and toward the rear of the reader.

b. Slide the chamber under the Name and Data Plate (fig. 1, item 5) and onto the Mechanism Plate. Continue to slide the chamber on the Mechanism Plate until it strikes the Film Chamber Stop with the cutout section correctly fitted around the end of the Film Guides.

c. Secure the Film Chamber with the Film Chamber Mounting Screw (fig. 2, item 3).

4. Film Chamber Cover

a. Place the Film Chamber Cover (fig. 1, item 11) over the Film Chamber (fig. 2, item 2) with the side flanges of the cover overlapping the sides of the reader cabinet. The open end of the cover should be toward the rear of the reader.

b. Lift the closed end of the cover slightly and slide the cover toward the rear of the reader until the cover must be lowered so the locking strips on the sides of the cover will engage the locking strips on the sides of the reader cabinet.

c. Lower the cover so the locking strips will engage and continue to slide the cover as far toward the rear of the reader as possible. If the cover binds as it is moved toward the rear of the reader, it is probably due to interference with the Name and Data Plate (fig. 1, item 5) or the Name and Data Plate Mounting Bracket. This condition can usually be corrected by a slight downward pressure on the cover or by moving the cover a little to the right or left.

d. Fasten the Film Chamber Cover by turning the Film Chamber Cover Stud (fig. 1, item 12) clockwise until it latches.

5. Screen

a. Lower the Screen (fig. 1, item 4) through the top of the cabinet with the dull side toward the front. Tilt the screen so the lower edge is slightly ahead of the upper edge while it is being lowered and moved forward. Lower the screen in this fashion until the up-

per edge can be tipped forward and placed in the upper mounting channel.

b. With the top edge in the upper mounting channel, slide the screen upwards until the bottom edge can be positioned over the lower mounting channel. Lower the screen until its lower edge bottoms in its mounting channel. Lower the screen until its lower edge bottoms in its mounting channel and the top edge is held in position by the upper mounting channel.

c. Clean both sides of the screen.

D. REASSEMBLY of IMAGE ROTATION ASSEMBLIES

1. Prism Drive Sprocket Bracket Assembly

a. Position the Sprocket Assembly (fig. 13, item 7) and the prism drive sprocket spacer in the prism drive sprocket bracket so that:

(1) The hub of the sprocket is toward the smaller arm of the bracket.

(2) The spacer is between the sprocket and the larger, slotted arm of the bracket.

b. Align the holes of the sprocket and spacer with the bearings and insert the Prism Control Shaft (fig. 12, item 1) through the bearing in the large bracket arm, then through the spacer and sprocket and into the bearing in the small arm of the bracket. Locate the shaft in the assembly so the set screws in the sprocket will tighten against the undercut on the shaft. Tighten the setscrews.

c. Guide the end of the prism control shaft through the .750 diameter hole in the front wall of the mirror well of the mechanism plate. Reach under the mechanism plate and steer the shaft into the Prism Control Shaft Guide (fig. 13, item 1). As the assembly is moved into position against the front wall of the well in the mechanism plate, slide the bracket onto the Drive Sprocket Bracket Stud (fig. 13, item 8) and guide the control shaft into and through the bearing in the name and data plate bracket.

d. Reassemble the retaining ring to the prism control shaft. This retainer is a Tru-arc E-ring.

e. Fasten the bracket in position on the stud with the Prism Rotating Sprocket Bracket Mounting Screw and Lockwasher (fig. 13, item 15). The screw passes through the slot in the large arm of the bracket and is threaded into the mechanism plate. Do not tighten this screw.

f. Rotate the Prism Mount Assembly (fig. 13, item 4) until it is in the position previously marked at disassembly. Pass the chain around the prism mount and the sprocket so that it engages the pin extending from the prism mount and the teeth on the sprocket, and the links to be joined will not pass over the sprocket, and the links to be joined will not pass over the sprocket as the prism mount is rotated.

g. Adjust the chain tension as directed. Do not change the position of the prism mount while adjusting the chain tension.

h. Assemble the Prism Rotating Knob (fig. 1, item 1) to the end of the control shaft so the stop pin in the knob is against the right side of the stop pin in the control shaft bearing. Tighten the setscrew.

i. Pull out on the rotating knob and determine whether the stop pin in the knob can be made to pass the stop pin in the bearing. If this occurs, rotate the knob to its counterclockwise limit, loosen the setscrew, hold the control shaft retaining ring against the back of the control shaft bearing, push the knob onto the shaft as far as possible, allowing .005 end play, and retighten the setscrew.

j. Check image rotation.

2. Prism Bearing Support Assembly

a. Replace tape bearing strips if they show wear.

b. Loosen the Prism Bearing Support Assembly Clamping Screw (fig. 13, item 12). Hold the Prism Mount Assembly (fig. 13, item 4) in its normal position in the Prism Bearing Bracket Assembly (fig. 13, item 10) and turn the Prism Bearing Support Assembly Adjusting Screw (fig. 13, item 11) until the dimension between the top of the prism mount and the bottom of the prism bearing support assembly is the same as measured at disassembly. This dimension should be recorded on the mechanism plate to the left of the mirror well.

c. Place the assembly on the bottom of the well in the mechanism plate and position

it correctly by reassembling the locating pins.

d. Add the 2 Prism Bearing Support Assembly Mounting Screws (fig. 13, item 14), lockwashers and flat washers, and tighten the screws securely.

e. Reassemble the Prism Mount Assembly (fig. 13, item 4).

f. Replace the screen and rear cover and check focus and image wander.

g. Check image rotation.

3. Prism Mount Assembly

Replace the Prism Mount Assembly (fig. 13, item 4). After reassembly is complete, check image rotation.

4. Mirror Mounts and Bracket Assembly

a. Reassemble the small mirror (fig. 12, item 14) to its Mount (fig. 12, item 11) by sliding it under the (2) right-hand Mirror Clamps (fig. 12, item 12), replacing the left-hand mirror clamp, and tightening all of the mirror clamp screws.

b. Assemble the small mirror and its mount to the Mirrors Mounting Bracket (fig. 12, item 9) with the 3 Mirror Mount Support Springs and 3 Mirror Adjusting Screws (fig. 12, item 13). The mirror mount rests on the springs and the adjusting screws pass through them and are threaded into the mirrors mounting bracket. Adjust each of the screws so the distance between the mount and the bracket is .375 at each corner of the mount. The theoretical tilt angle of the small mirror is 32° 30' with respect to the mirrors mounting bracket feet.

c. Reassemble the Large Mirror (fig. 12, item 15) to its mount (fig. 12, item 16) by sliding the mirror into position under the mirror clamps and tightening the mirror clamp screws.

d. If it is necessary to reassemble the large mirror and its mount to the mirrors mounting bracket, proceed as follows:

(1) Hold the mirror mount in position (fig. 12) with one hand, and with the other slide the Large Mirror Mount Pivot (fig. 12, item 17) through the holes in the mount and in the bracket.

(2) Replace the 2 large mirror mount screws and lockwashers, but do not tighten them.

(3) Replace the triangular retainer at one end of the pivot. Slide it onto the pivot until it is against the mirror mount.

(4) Adjust the mirror mount on its pivot until the locating holes are aligned and then replace the pins which were removed at disassembly. Tighten the 2 large mirror mount screws. The theoretical angle between the two mirrors is 100° 30'.

(5) Place the assembly in position on the mechanism plate, align the locating pinholes and replace the locating pins.

(6) Reassemble the 4 Mirrors Mounting Bracket Screws (fig. 12, item 10), threading them into 2 Tinnerman Speed Nuts which bear against the underside of the mechanism plate. Tighten the screws securely.

(7) Clean both mirrors, replace the rear cover and screen, and check keystoning, image centering, and magnification.

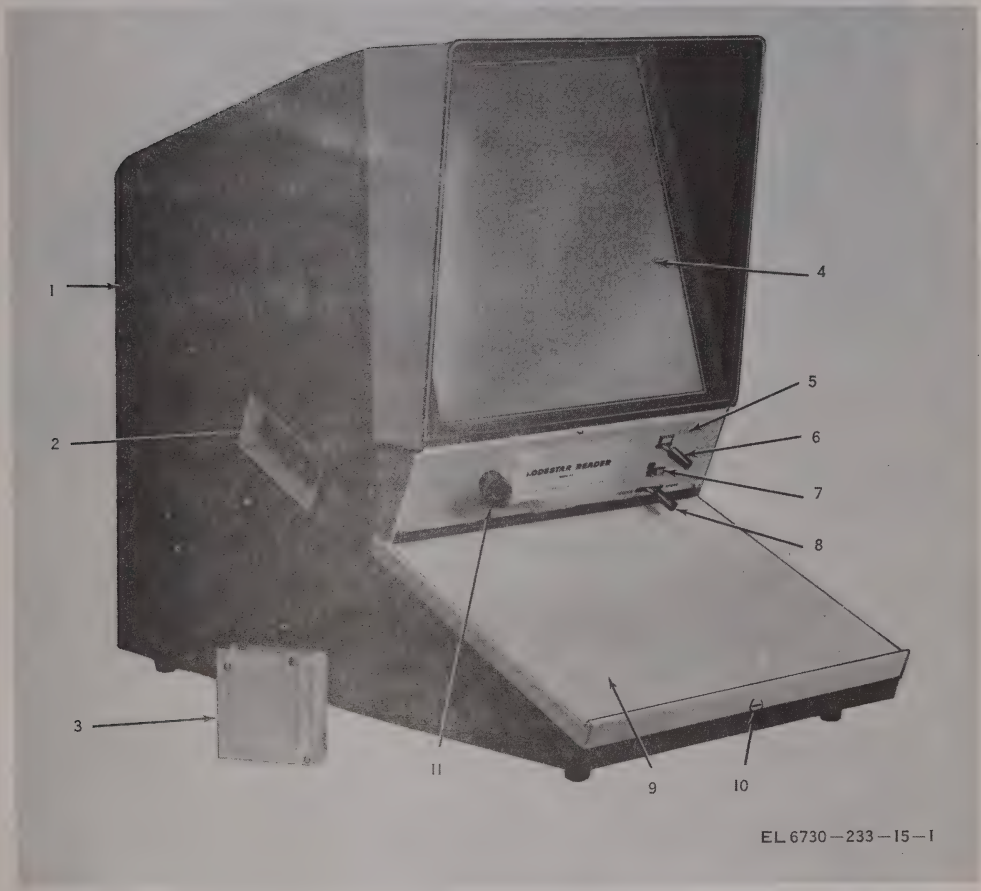
5. Prism Rotating Knob Assembly

a. Rotate the Prism Mount Assembly (fig. 13, item 4) so the Prism Adjusting Stud (fig. 13, item 6) is at the 9 o'clock position when viewed from the front of the machine.

b. Press the prism control shaft retaining ring forward until it is against the shoulder of the bearing in the name and data plate support bracket. Hold the retaining ring in this position and slide the Prism Rotating Knob Assembly (fig. 1, item 1) onto the end of the Prism Control Shaft (fig. 12, item 1) as far as possible, allowing .005 end play. Rotate the knob until the stop pin is approximately 1/8" to the right of the stop pin in the control shaft bearing. Tighten the setscrew in the knob.

c. Check image rotation. The amount of image rotation should exceed 270° by a small amount and the excess should be evenly divided at each end of the rotating knob travel. If these conditions do not exist, loosen the setscrew and adjust the knob on the shaft until the stop pin in the knob is oriented correctly with respect to image rotation. Remember to hold the retaining ring against the bearing whenever the knob is tightened on the shaft.

Section VIII. ILLUSTRATIONS

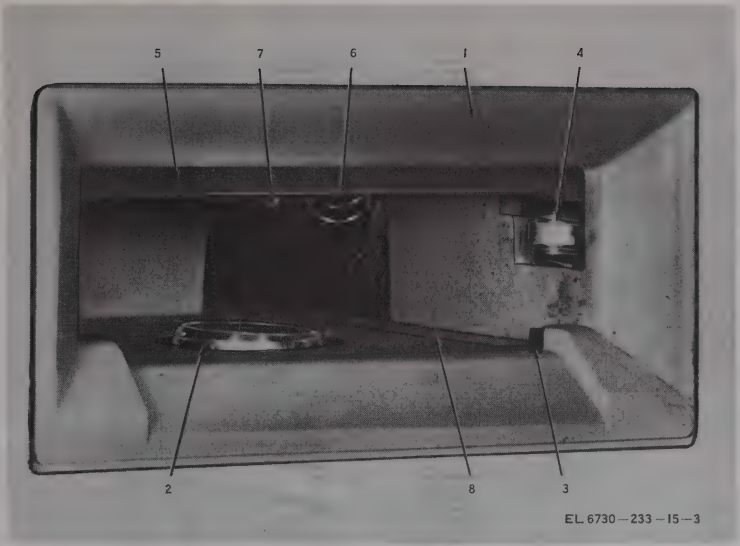


1 Cabinet assembly
2 Magazine cavity
3 Recordak film reader magazine complete assembly
4 Screen
5 Name and data plate
6 Focus lever
7 Control lever lock
8 Control lever
9 Film chamber cover
10 Film chamber cover stud
11 Rotate knob

Figure 1. Front view of reader.

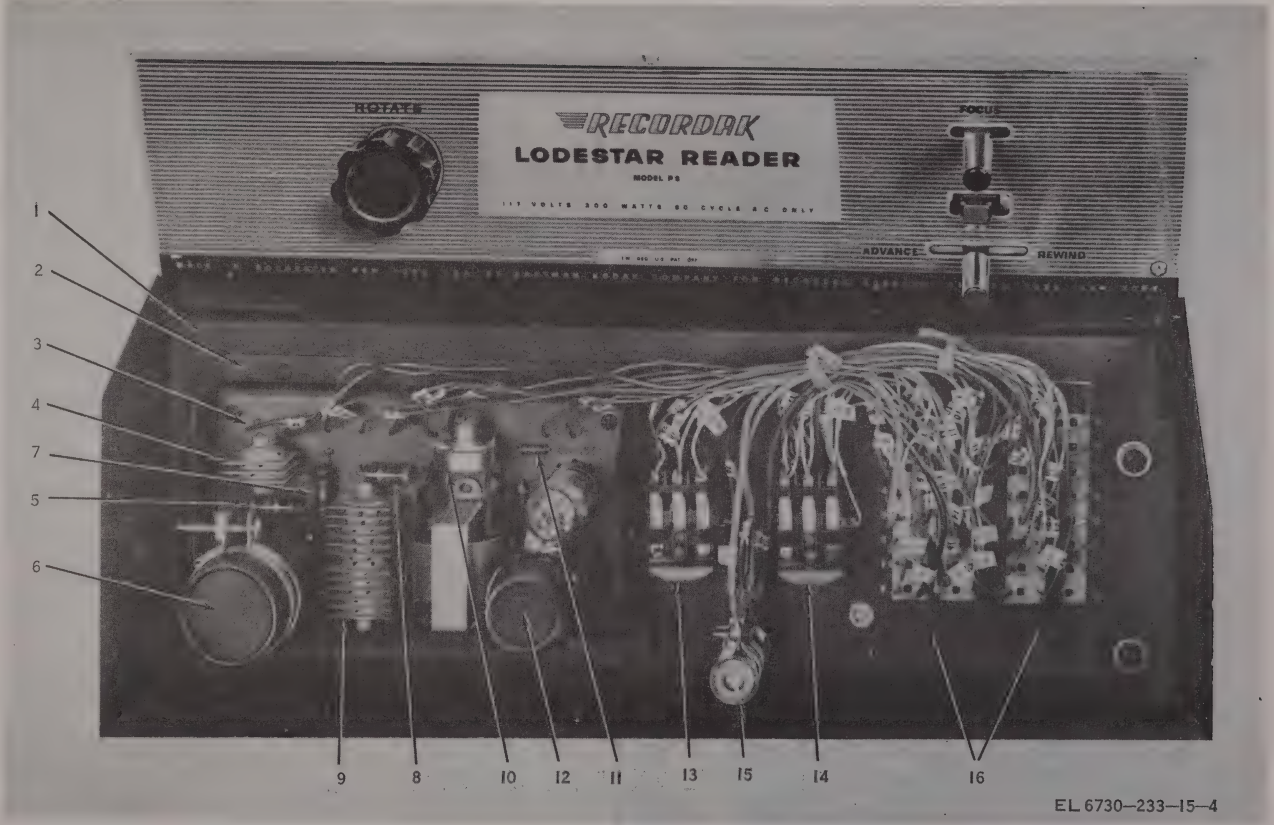
1 Recordak film reader magazine complete assembly
2 Film chamber
3 Film chamber mounting screw
4 Magazine cavity

Figure 2. Film chamber, cover removed.



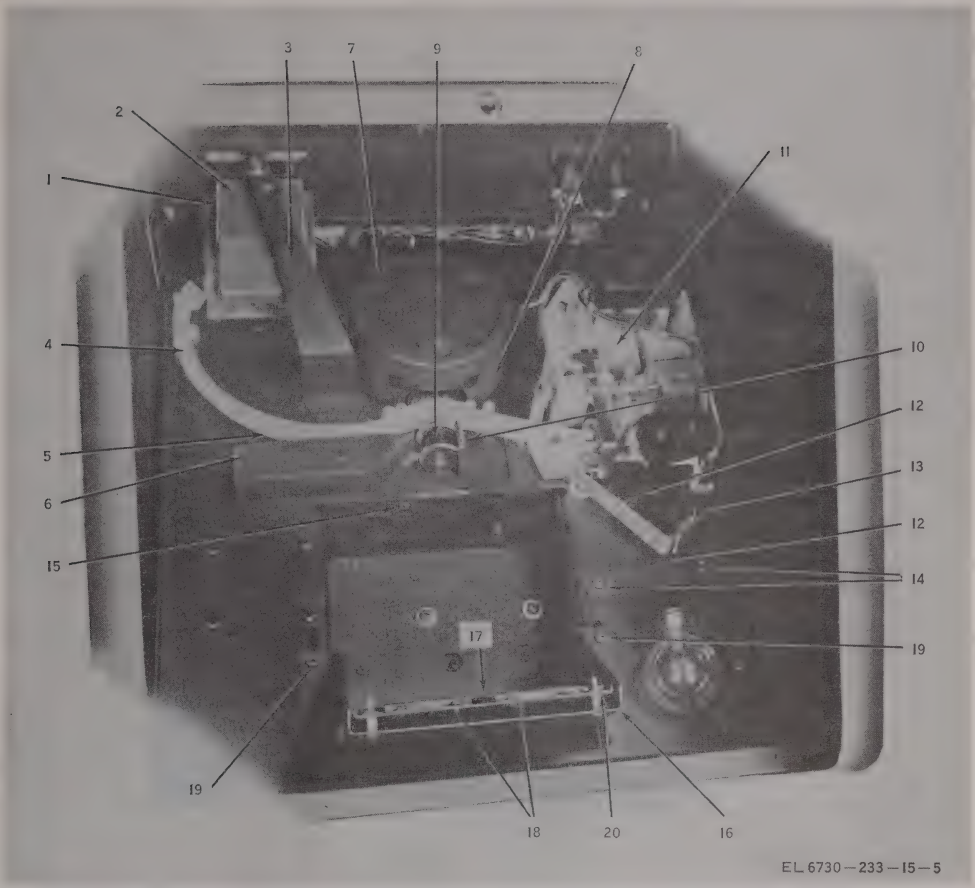
1 Magazine cavity
2 Clutch and magnet assembly
3 Magazine locating switch link
4 Interlock solenoid switch
5 Interlock blade
6 Magazine locating spring
7 Power failure lockout lever
8 Tape strip

Figure 3. Magazine cavity entrance.



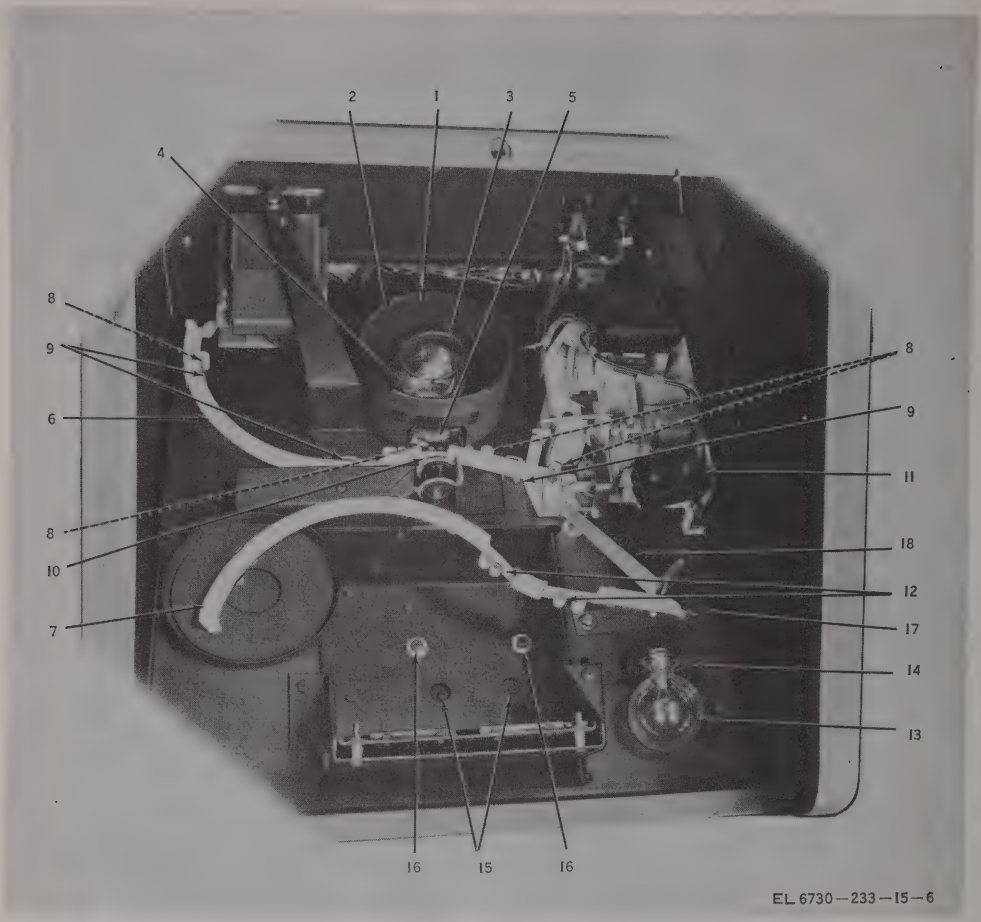
1	Mechanism plate	5	Discharge resistor	9	Clutch rectifier	13	Film tab relay
2	Printed circuit mounting bracket	6	Clutch capacitor	10	Low speed adjusting potentiometer	14	Motor transfer relay
3	Printed circuit board assembly	7	Clutch solenoid resistor	11	Control circuit current limiting resistor	15	Takeup motor resistor
4	Discharge rectifier	8	Rectifier resistor	12	SCR package	16	Main terminal strips—topside

Figure 4. Electrical panel.



1 Motor control unit assembly
2 Motor control switch cover
3 Focusing lever
4 Upper film guide and setscrews assembly
5 Lower film guide
6 Small air duct
7 Lamphouse cover assembly
8 Lamphouse
9 Projection lens complete assembly
10 Lens barrel spring
11 Cavity assembly (see fig. 8)
12 High speed motor mounting screw (2)
13 Takeup motor assembly mounting screw (3)
14 High speed motor and clutch assembly mounting screw (3)
15 Focus lever pivot stud adjusting screw
16 Mirror support bracket
17 Movable mirror mount plate
18 Mirror clamp (3)
19 Mirror support bracket screw (4)
20 Mirror adjusting screw (3)

Figure 5. Interior view, top of mechanism assembly.



1 Lamphouse
2 Lamphouse cover tab
3 Reflector
4 Projection lamp
5 Condenser lens
6 Lower film guide
7 Upper film guide and set screws assembly
8 Lower film guide mtg. screw (4)—not visible
9 Film guide spring (3)
10 Film gate
11 Magazine locating block
12 Upper film guide adjusting setscrew (2)
13 Spare projection lamp
14 Spare lamp clip
15 Low speed motor and sprocket assy. mtg. screw (2)
16 Low speed motor and mounting plate assembly Mounting Screw (3)
17 High speed motor locking plate
18 Pressure roller reed

Figure 6. Additional parts, top of mechanism assembly.

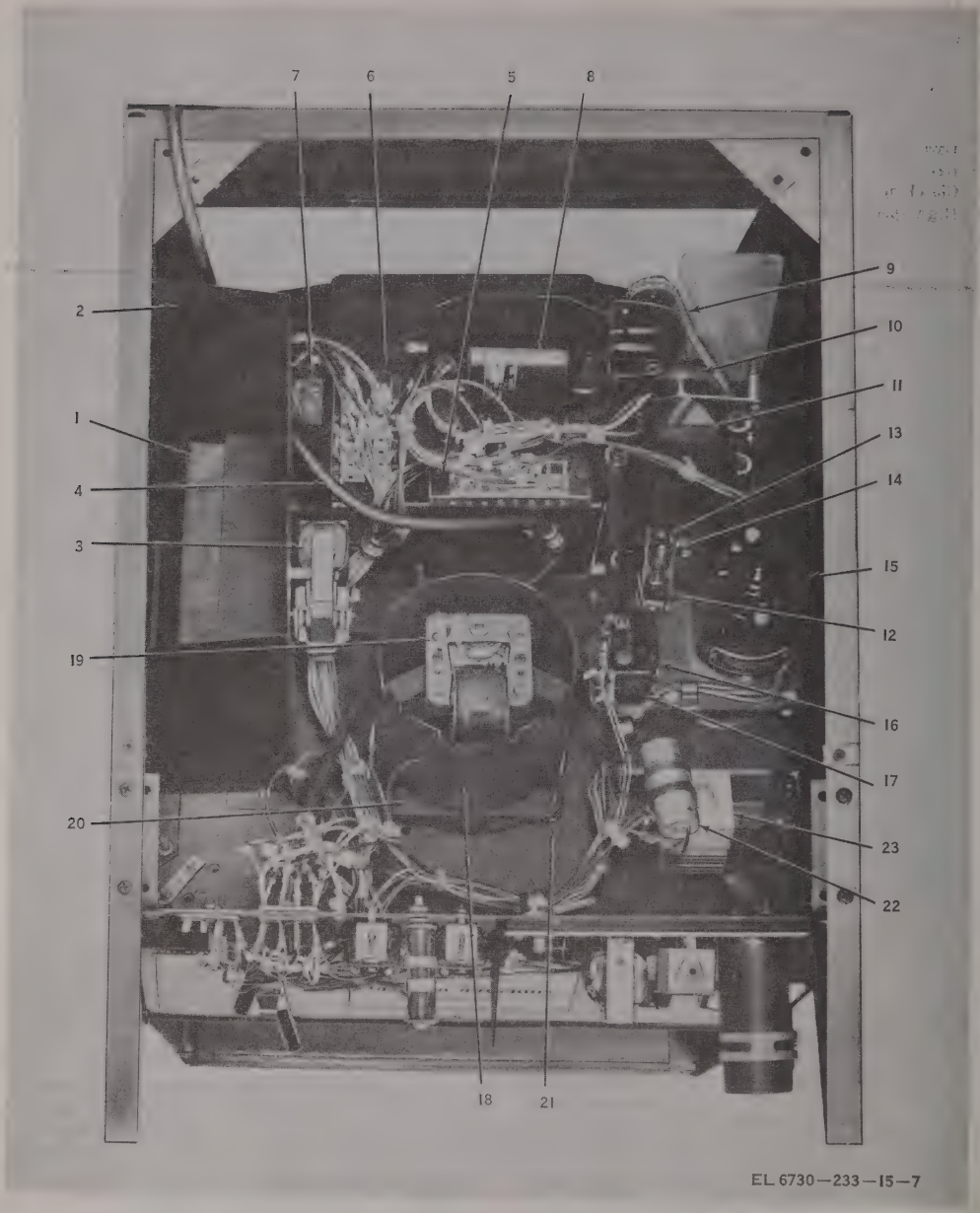
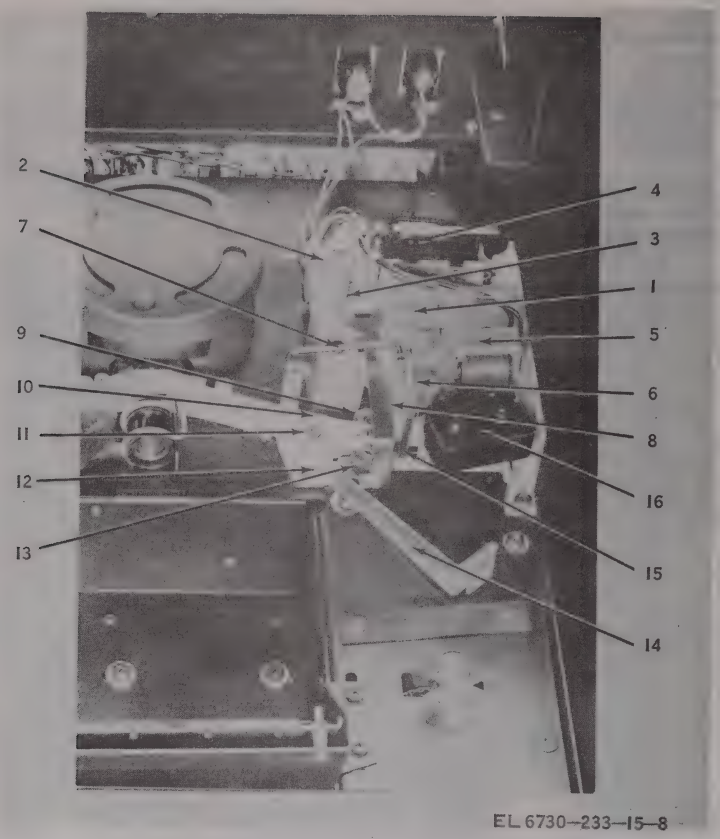


Figure 7. Interior view, bottom of mechanism assembly.

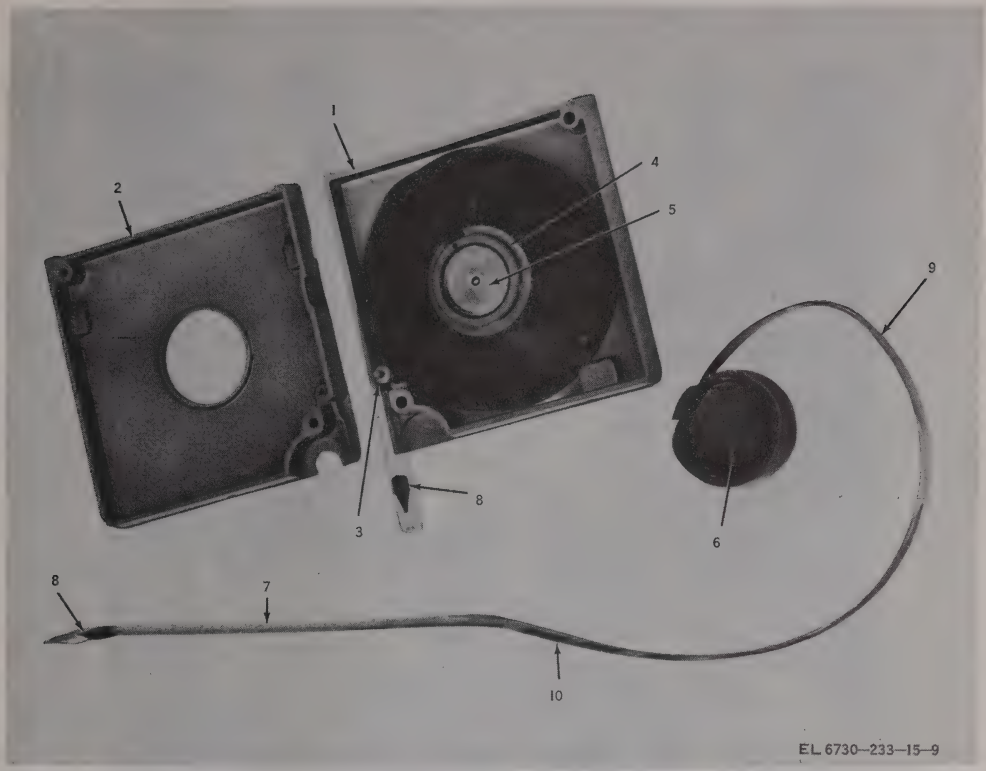
1 Film cooling filter
2 Large air duct
3 Film cooling fan motor
4 Line cord assembly
5 Motor terminal strip
6 Transformer terminal strip
7 Projection lamp transformer
8 Low speed drive motor
9 Drive chain
10 Clutch sprocket assembly
11 High speed drive motor
12 Drag shoe retainer spring
13 Drag shoe retainer (2)
14 Drag shoe drum assembly
15 Takeup motor
16 Interlock solenoid hold switch
17 Motor protection switch
18 Lamphouse
19 Lamp cooling fan motor
20 Lamphouse support plate
21 Lamphouse support plate locknut (2)
22 Takeup motor capacitor
23 Takeup motor rectifier

Figure 7—Continued.



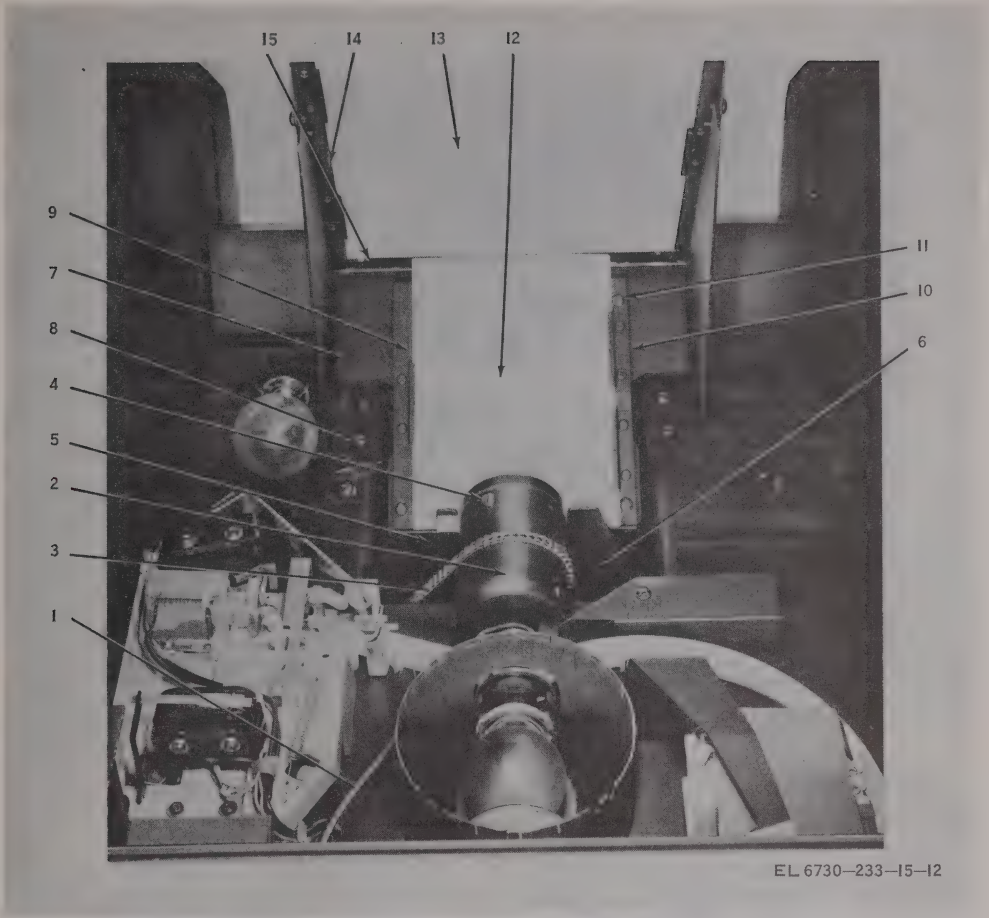
1 Magazine cavity
2 Magazine locating spring
3 Power failure locknut lever spring
4 Magazine locating switch
5 Interlock solenoid
6 Interlock blade push rod
7 Solenoid drag link
8 Power failure lockout lever
9 Drive roller
10 Upper film guide
11 Pressure roller arm stud
12 Pressure roller arm
13 Pressure roller
14 Pressure roller reed
15 Film tab switch actuating lever
16 Film tab switch

Figure 8. Magazine cavity.



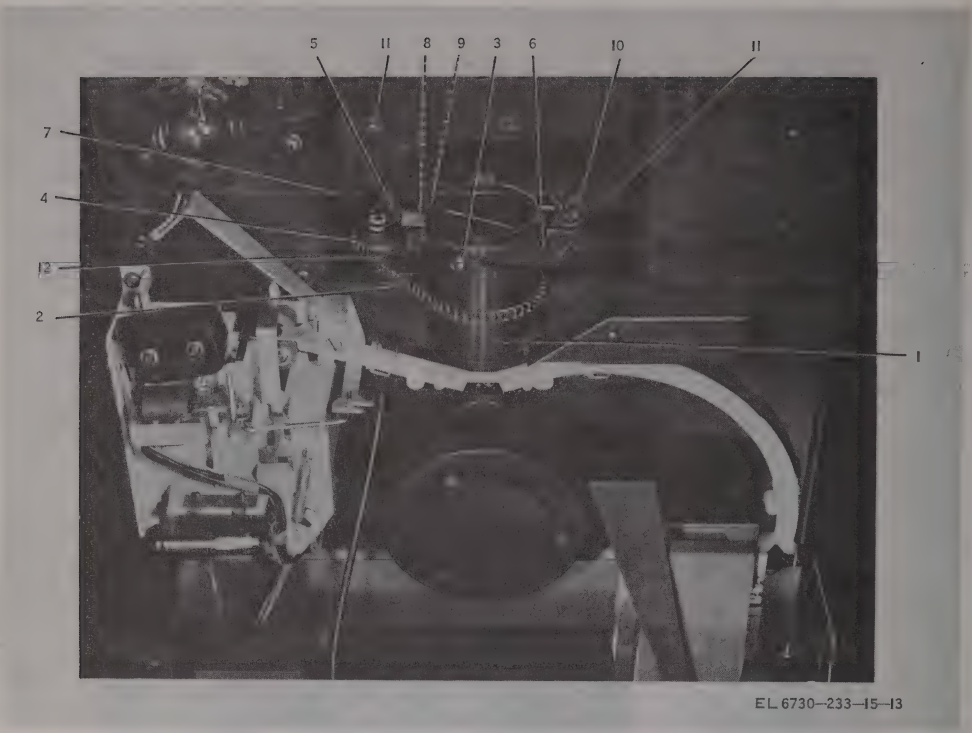
1 Top half magazine case
2 Lower half of magazine case
3 Magazine roller
4 Magazine core
5 Magazine core disc
6 Magazine core assembly
7 Film leader
8 Film tab
9 Film trailer
10 Emulsion side of film

Figure 9. Film magazine.



1 Shaft, prism control
2 Assembly, prism mount
3 Chain, prism drive
4 Stud, prism adjusting
5 Assembly (prism bearing bracket)
6 Assembly, rear prism bearing arm
7 Bracket, mirror mounting
8 Screw, mirror mounting bracket (4)
9 Mount, small mirror
10 Clamp, mirror (6)
11 Screw, mirror adjusting (3)
12 Mirror, large
13 Mirror, large
14 Mount, large mirror
15 Pivot, large mirror mount

Figure 12. Interior view, top of mechanism plate.



1 Assembly, prism mount
2 Chain, prism drive
3 Stud, prism adjusting
4 Assembly, sprocket
5 Stud, drive sprocket bracket
6 Assembly, rear prism bearing arm
7 Assembly, prism bearing bracket
8 Screw, prism bearing support adjusting—not visible
9 Screw, prism bearing support clamping—not visible
10 Screw, rear prism bearing arm assembly mounting (2)
11 Screw, prism bearing support assembly mounting (2)
12 Screw, prism drive sprocket assembly mounting

Figure 13. Prism drive mechanism and prism mount supports.

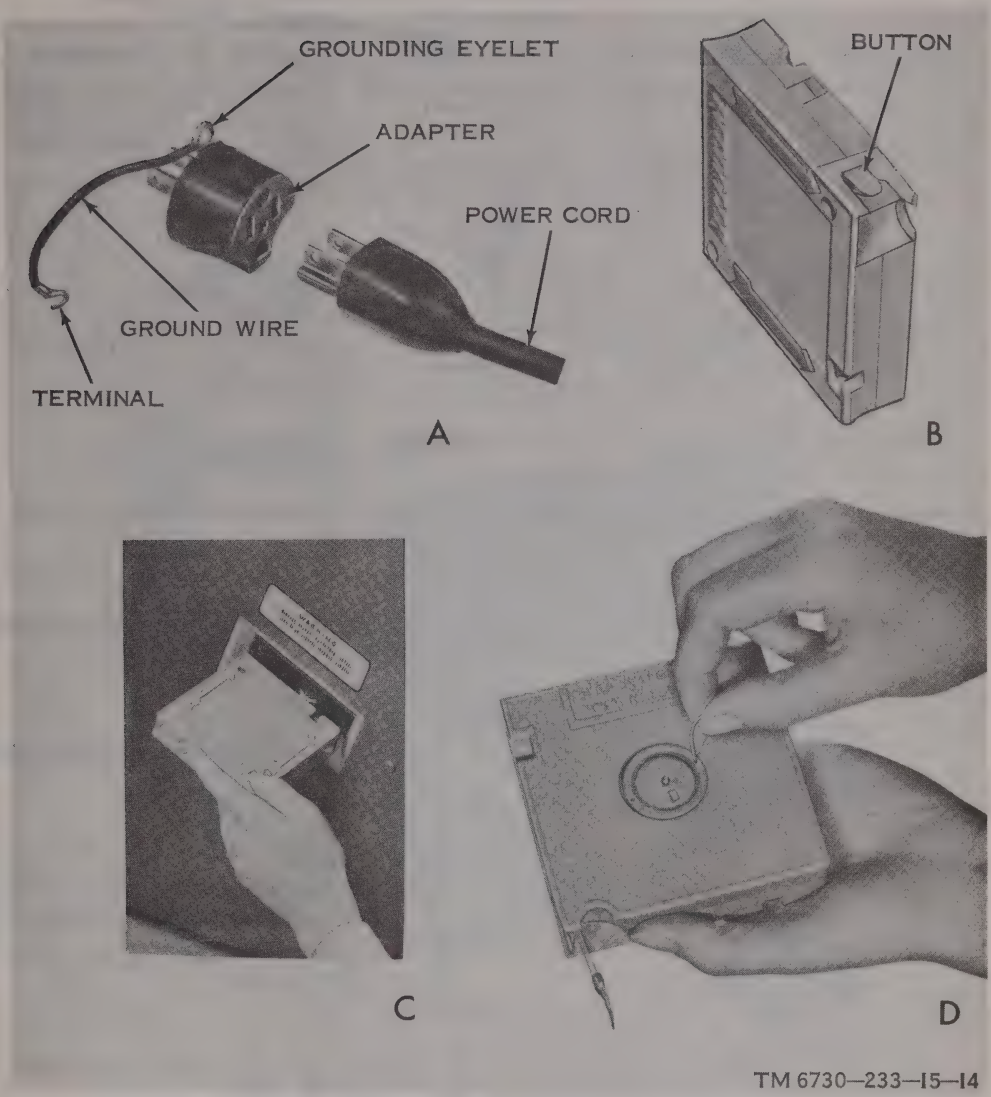


Figure 14. Power cord and magazine installation.

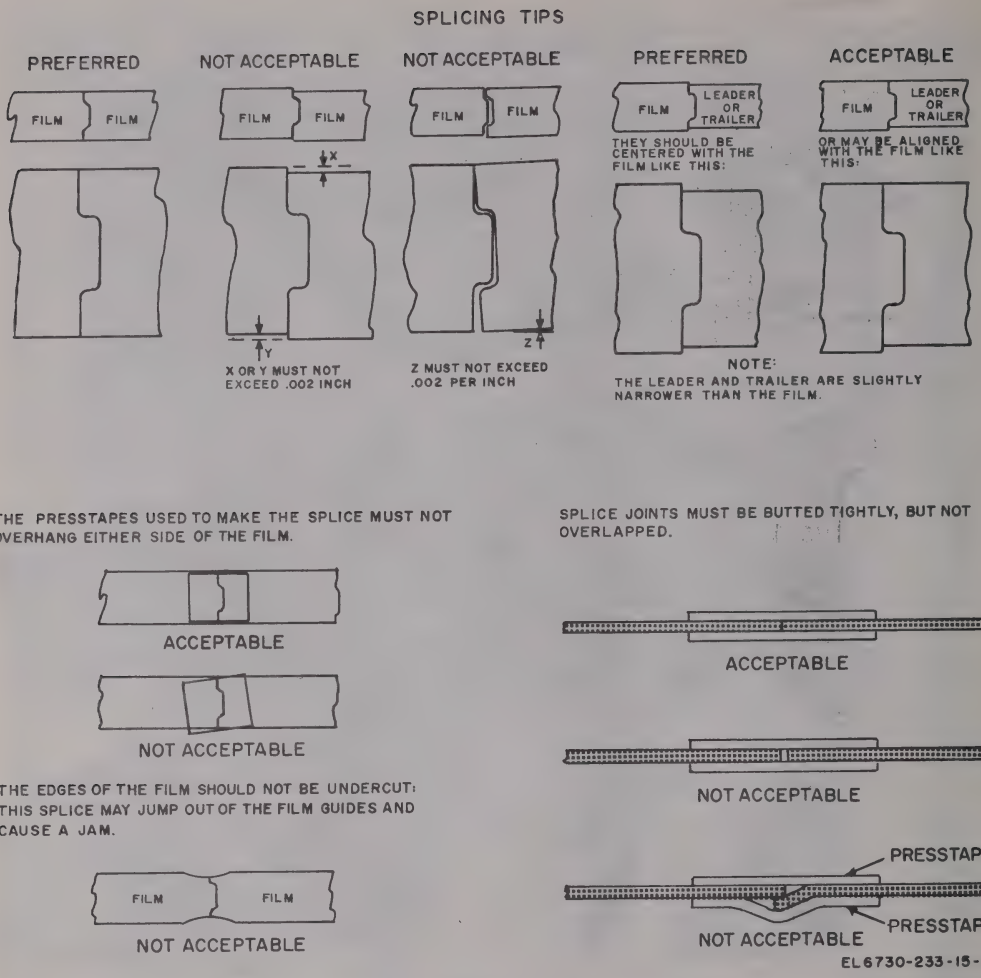

SPLICING TIPS
PREFERRED
NOT ACCEPTABLE
NOT ACCEPTABLE
PREFERRED
ACCEPTABLE
FILM
FILM
LEADER OR TRAILER
X
Y
Z
THEY SHOULD BE CENTERED WITH THE FILM LIKE THIS:
OR MAY BE ALIGNED WITH THE FILM LIKE THIS:
X OR Y MUST NOT EXCEED .002 INCH
Z MUST NOT EXCEED .002 PER INCH
NOTE:
THE LEADER AND TRAILER ARE SLIGHTLY NARROWER THAN THE FILM.
THE PRESSTAPES USED TO MAKE THE SPLICE MUST NOT OVERHANG EITHER SIDE OF THE FILM.
ACCEPTABLE
NOT ACCEPTABLE
THE EDGES OF THE FILM SHOULD NOT BE UNDERCUT: THIS SPLICE MAY JUMP OUT OF THE FILM GUIDES AND CAUSE A JAM.
NOT ACCEPTABLE
SPLICE JOINTS MUST BE BUTTED TIGHTLY, BUT NOT OVERLAPPED.
ACCEPTABLE
NOT ACCEPTABLE
PRESSTAPE
PRESSTAPE
NOT ACCEPTABLE
EL6730-233-15-15

Figure 15. Splicing tips.

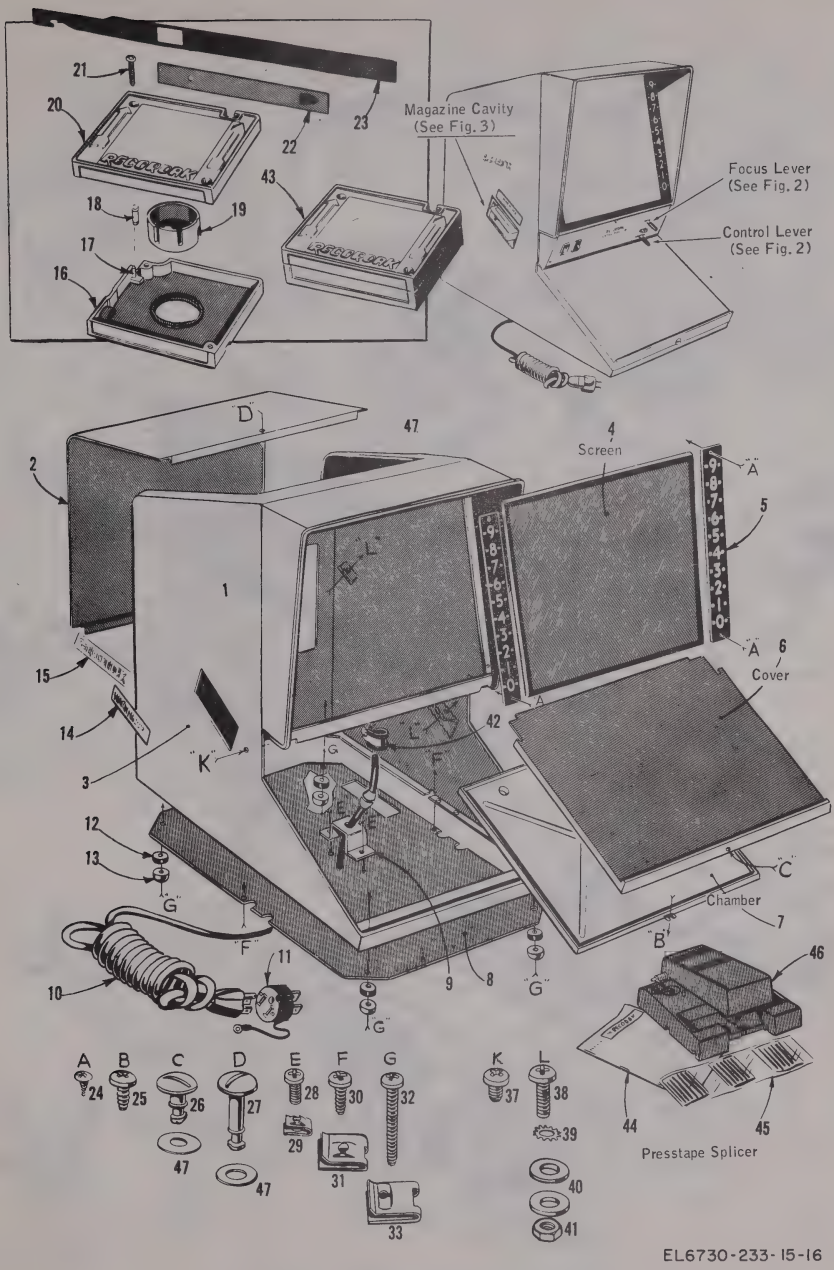


Figure 16. Illustrated parts.

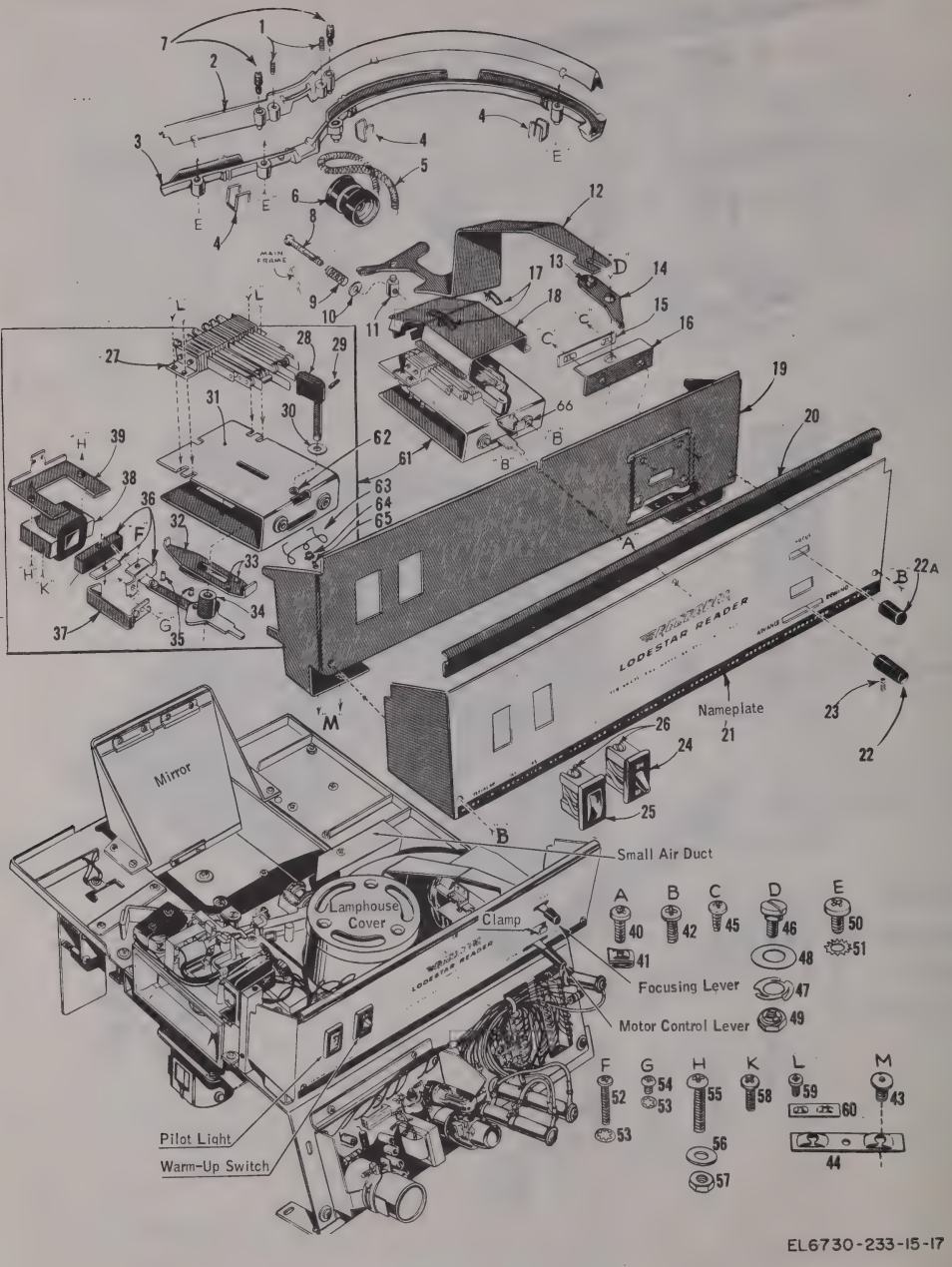


Figure 17. Illustrated parts—Continued.

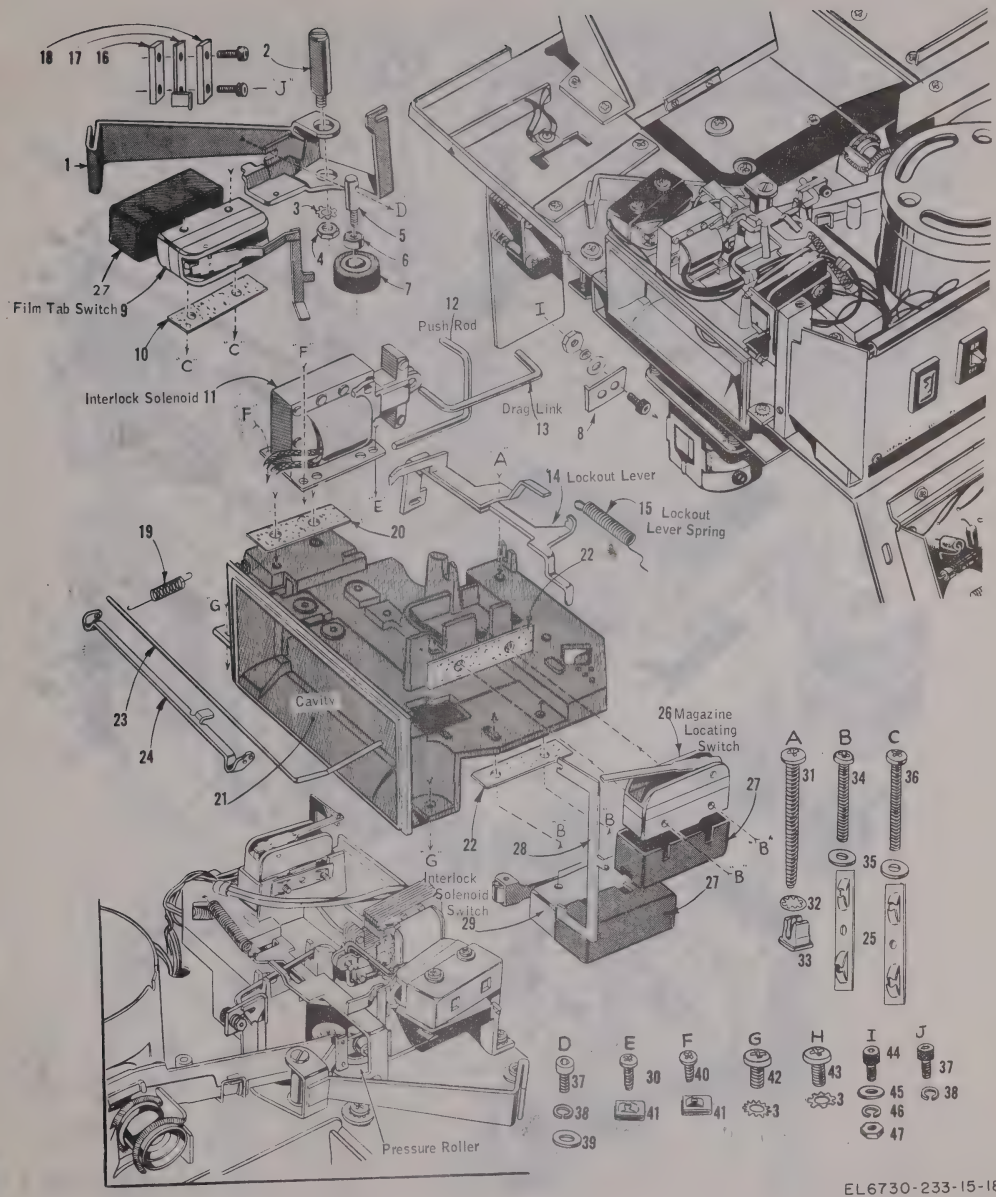


Figure 18. Illustrated parts—Continued.

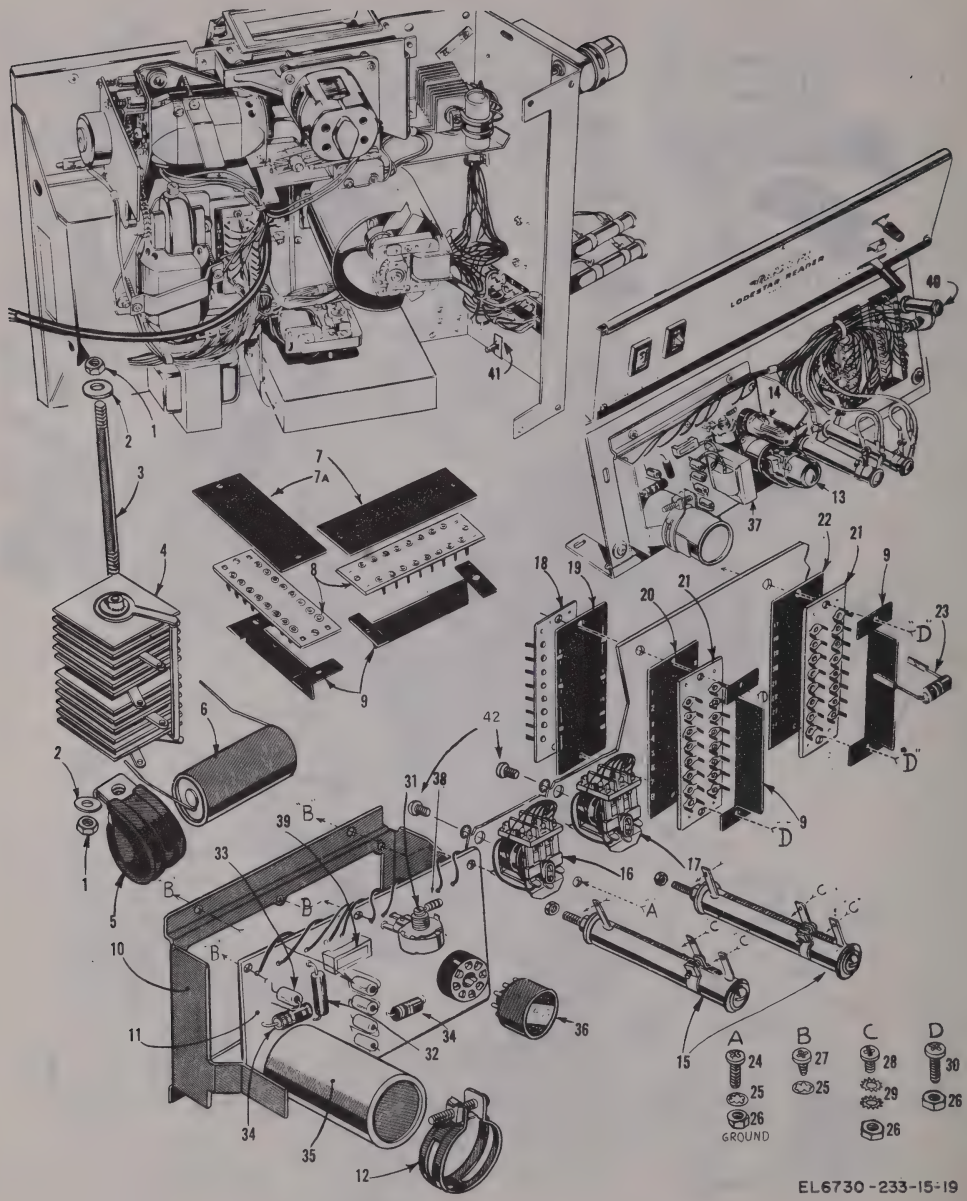


Figure 19. Illustrated parts—Continued.

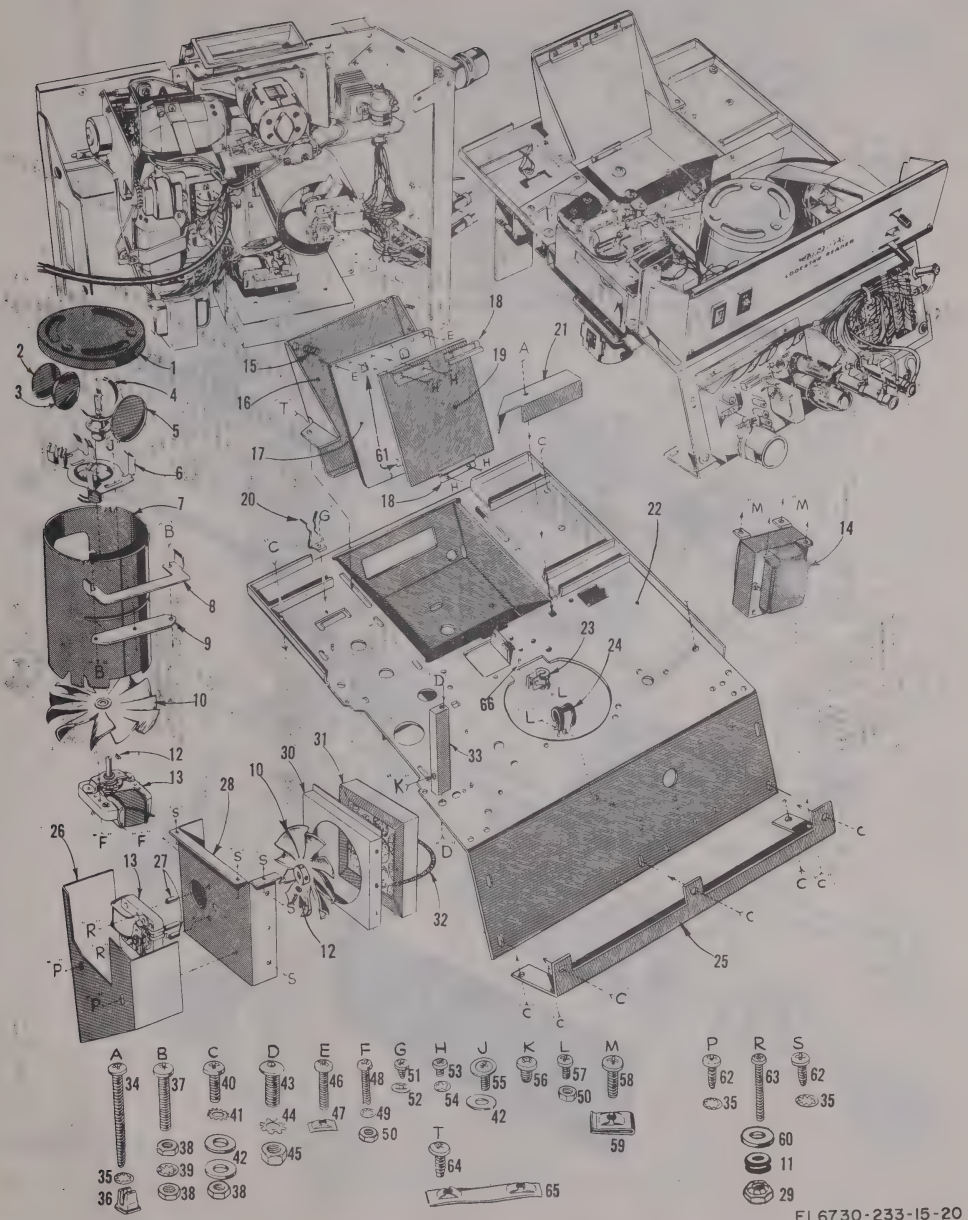


Figure 20. Illustrated parts—Continued.

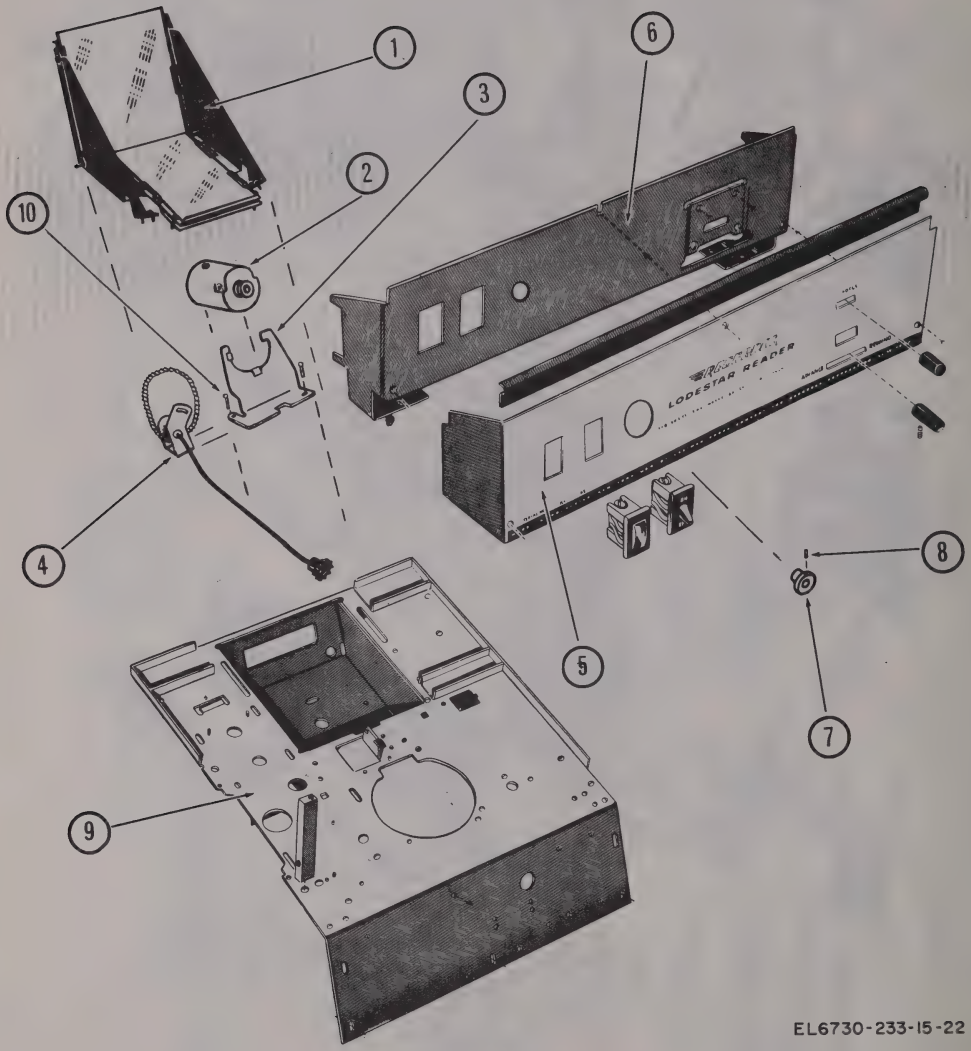


Figure 21. Illustrated parts—Continued.

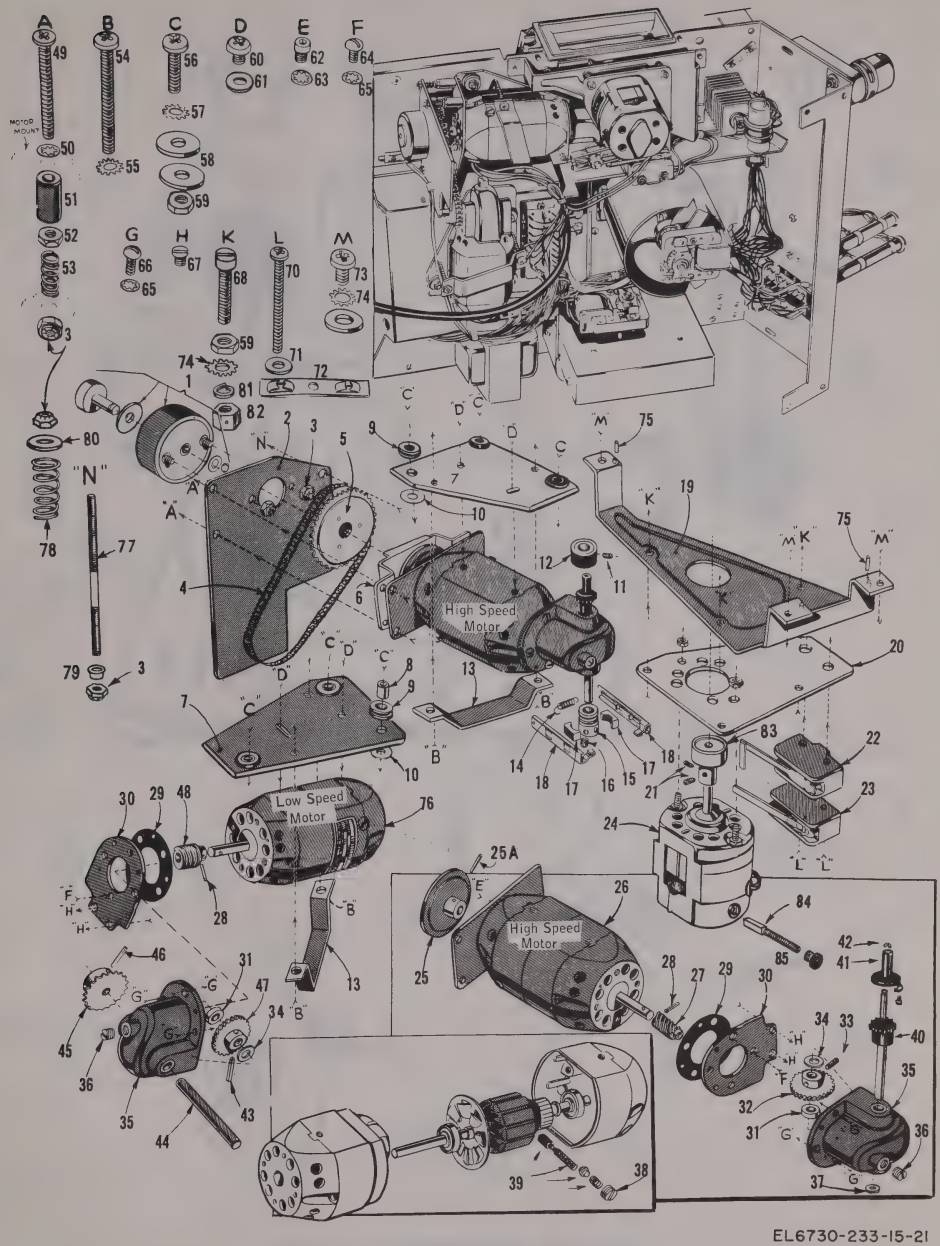


Figure 22. Illustrated parts—Continued.

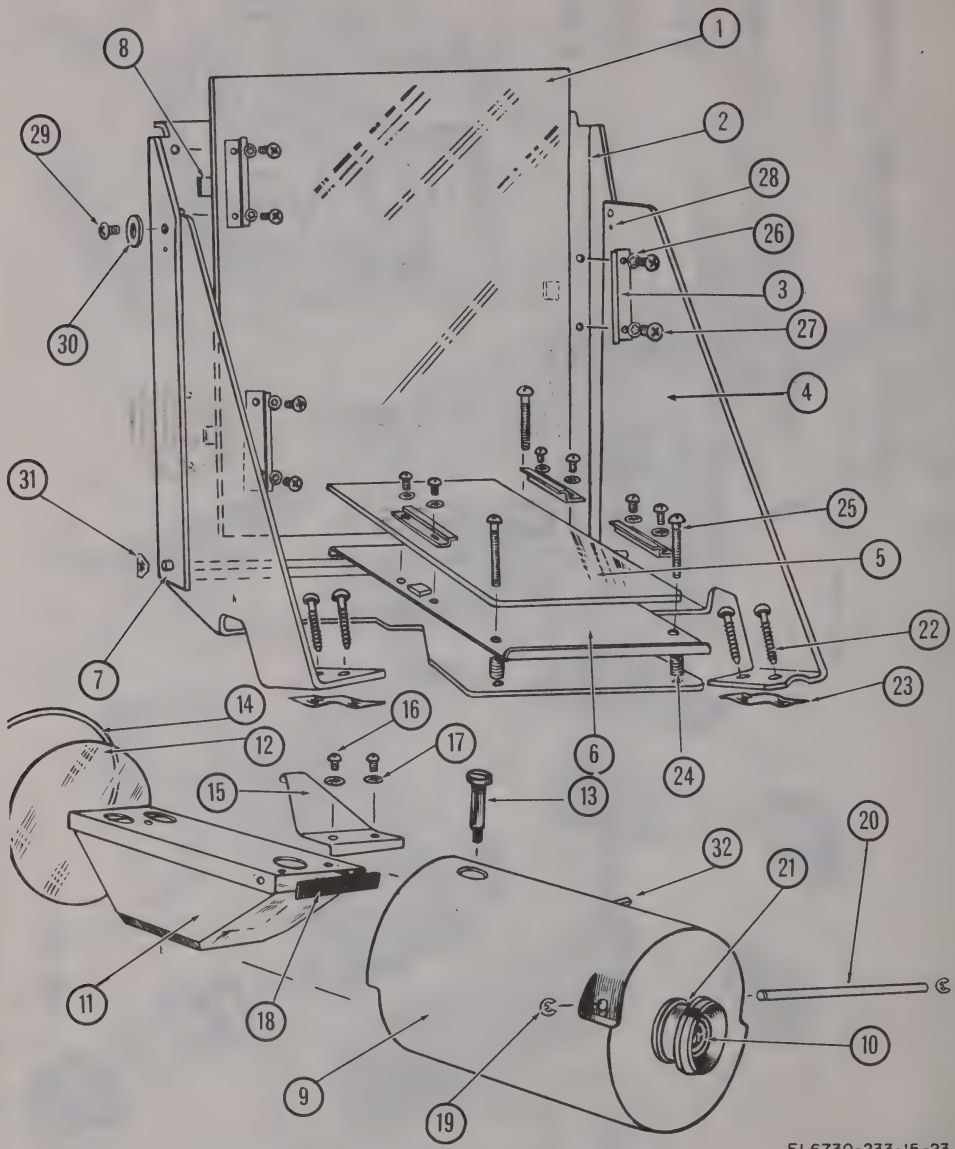


Figure 23. Illustrated parts—Continued.

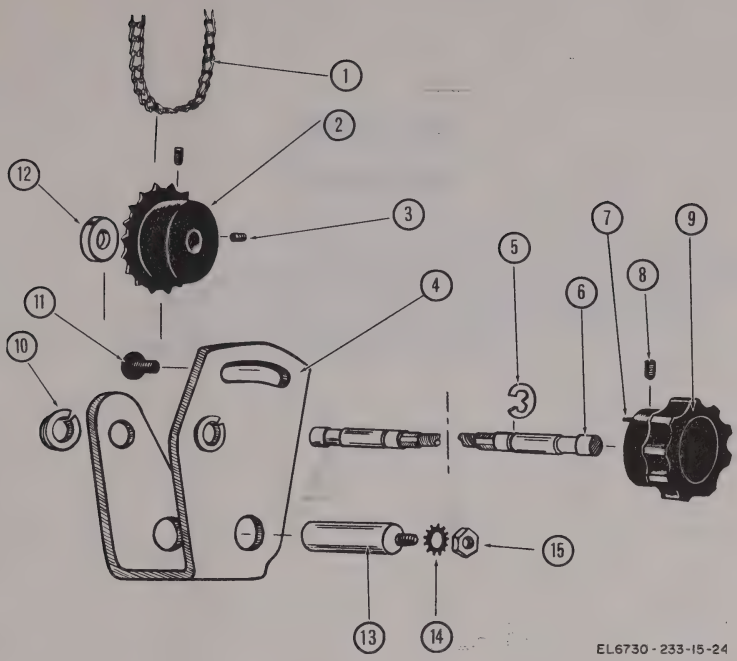


Figure 24. Illustrated parts—Continued.

APPENDIX A

REFERENCES

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 7, 8, and 9), Supply Bulletins, asd Lubrication Orders
DA Pam 310-7	U. S. Army Equipment Index of Modification Work Orders
TM 38-750	Army Equipment Record Procedures

APPENDIX B

BASIC ISSUE ITEMS

Section I. INTRODUCTION

B-1. Scope

This appendix lists items comprising an operable equipment and those required for installation, operation, or operator's maintenance for Viewer, Still Picture PS-1.

B-2. Explanation of Columns

The following is a list of explanations of columns in section II.

a. Source, Maintenance, and Recoverability Codes (SMR) Column.

(1) *Source code (S).* The selection status and source for the listed item is the first code indicated in this column. The source codes used and their explanations are—

Code	Explanation
P —	Applies to repair parts that are stocked in or supplied from GSA/DSA, or Army supply system, and authorized for use at indicated maintenance categories.
X1 —	Applies to repair parts that are not procured or stocked, the requirements for for which will be supplied by the use of next higher assembly or component.

(2) *Maintenance code (M).* The lowest category of maintenance authorized to install the item is indicated by the second code in the column. The maintenance category codes and their explanations are—

Code	Explanation
C --	Operator/Crew
O --	Organizational maintenance

(3) *Recoverability code (R).* The recoverability code and its explanation is as follows: It indicates whether unserviceable items should be returned for recovery or salvage. Recoverability code and its explanation is as follows:

Note. When no code is indicated in the recoverability column, the part will be considered expendable.

Code	Explanation
R —	Applies to repair parts and assemblies that are economically repairable at DSU and GSU activities and are normally furnished by supply on an exchange basis.

b. Federal Stock Number Column. This column indicates the Federal stock number for the item.

c. Description Column. This column includes the Federal item name and any additional description of the item which may be required. A part number or other reference number is followed by the applicable five-digit Federal Supply Code for Manufacturers. Usable on code column is not used.

d. Unit of Issue Column. The unit used as a basis of issue (e.g., ea, pr, ft, yd, etc.) is given in this column.

e. Quantity Incorporated in Unit Pack Column. Not used.

f. Quantity Incorporated in Unit Column. The total quantity of the item used in the equipment is given in this column.

g. Quantity Furnished with Equipment Column. This column lists the quantity of the item supplied for initial operation of the equipment and/or the quantities authorized to be kept on hand by the operator for maintenance of the equipment

h. Quantity Authorized Column. Not used.

i. Illustrations Column.

(1) *Figure number (a).* The number of the illustration on which the item is shown is indicated in this column.

(2) *Item No. or reference designation (b).* The item number callout used to reference the item on the illustration appears in this column.

SECTION II BASIC ISSUE ITEMS

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION Reference Number & Mfr Code USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) QTY FURN WITH EQUIP	(7) ILLUSTRATIONS (a) FIG. NO.	(7) ILLUSTRATIONS (b) ITEM NO. OR REFERENCE DESIGNATION
	6730-808-6445	VIEWER, STILL PICTURE PS-1 (This item is nonexpendable)					
		TECHNICAL MANUAL TM 11-6730-233-15	ea	1	1		
		Requisition through pinpoint account number if assigned; otherwise through nearest Adjutant General facility.					
		For technical manuals the quantity indicates the maximum number of copies authorized for issue with the equipment. Where a number of these equipments are concentrated in a small area, the quantity on hand may be reduced to minimum actual requirements as determined by the commanding officer of the unit.					
P-C	5935-081-8025	CONNECTOR, ADAPTER: 868866; 89503	ea	1	1	16	11
P-C	5340-016-8351	FOOT, RUBBER: 72815; 89503	ea	4	4	16	13
P-O	6240-548-0019	LAMP: 1240; 08806	ea	1	2	20	4
X1	6730-018-4520	LAMPHOUSE COVER ASSEMBLY: 872109; 89503	ea	1	1	20	1
X1	6730-018-4519	MOUNT & BRACKET ASSEMBLY, MIRROR: 872709; 89503	ea	1	1	22	1
P-C	6730-018-1940	PRISM ASSEMBLY: 872702; 89503	ea	1	1	22	12
P-C	6730-018-4517	SCREEN: 879357; 89503	ea	1	1	16	4
		NO ACCESSORIES, TOOLS, OR TEST EQUIPMENT ARE TO BE ISSUED WITH THIS EQUIPMENT					
		THE FOLLOWING ITEMS & THEIR QUANTITIES ARE MOUNTED IN OR ON THIS EQUIPMENT					
P-O	6240-548-0019	LAMP; 1					

APPENDIX C

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

C-1. General

This appendix provides a summary of the maintenance operations covered in the equipment literature for Viewer, Still Picture PS-1. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

C-2. Explanation of Format for Maintenance Allocation Chart

a. Group Number. Not used.

b. Component Assembly Nomenclature. This column lists the item names of component units, assemblies, subassemblies, and modules on which maintenance is authorized.

c. Maintenance Function. This column indicates the maintenance category at which performance of the specific maintenance function is authorized. Authorization to perform a function at any category also includes authorization to perform that function at higher categories. The codes used represent the various maintenance categories as follows:

Code	Maintenance category
C	Operator/crew
O	Organizational maintenance
F	Direct support maintenance
H	General support maintenance
D	Depot maintenance

d. Tools and Equipment. The numbers appearing in this column refer to specific tools and equipment which are identified by these numbers in section III.

e. Remarks. Self-explanatory.

C-3. Explanation of Format for Tool and Test Equipment Requirements

The columns in the tool and test equipment requirements chart are as follows:

a. Tools and Equipment. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool for the maintenance function.

b. Maintenance Category. The codes in this column indicate the maintenance category normally allocated the facility.

c. Nomenclature. This column lists tools, test, and maintenance equipment required to perform the maintenance functions.

d. Federal Stock Number. This column lists the Federal stock number.

e. Tool Number. Not used.

MAINTENANCE ALLOCATION CHART

GROUP NUMBER	COMPONENT ASSEMBLY NOMENCLATURE	MAINTENANCE FUNCTIONS											TOOLS AND EQUIPMENT	REMARKS
		INSPECT	TEST	SERVICE	ADJUST	ALIGN	CALIBRATE	INSTALL	REPLACE	REPAIR	OVERHAUL	REBUILD		
	VIEWER, STILL PICTURE PS-1	C		C										Preventive maintenance
				O					O				1	replace projection lamp Lubricate, replace screen,
														replace film guides, film
														cooling filter; mirrors
			F		F	F				F			1,2,3	Align reflector & projection
														lamp, focusing mechanism,
														clutch solenoid, troubleshoot
											H		1,2,3	
												D	1,2,3	Plus shop support
	PRISM ASSEMBLY				O				O				1	
	PRINTED CIRCUIT ASSEMBLY								O				1	
			F							F			1,2,3	
	TAPE SPLICER								O	F			1,2	

TOOL AND TEST EQUIPMENT REQUIREMENTS

TOOLS AND EQUIPMENT	MAINTENANCE CATEGORY	NOMENCLATURE	FEDERAL STOCK NUMBER	TOOL NUMBER
		VIEWER, STILL PICTURE PS-1 (CONTINUED)		
1	O,F,H,D	TOOL KIT TK-77/GF	5180-752-9068	
2	F,H,D	TOOL KIT TK-109/GF	5180-856-9653	
3	F,H,D	MULTIMETER TS-352B/U	6625-242-5023	

APPENDIX D

ORGANIZATIONAL, DS, GS, AND DEPOT REPAIR PARTS AND SPECIAL TOOLS

Section I. INTRODUCTION

D-1. Scope

This appendix contains a list of repair parts and special tools required for the performance of organizational maintenance and a list covering the corresponding requirements for direct support, general support, and depot maintenance for Viewer, Still Picture Model PS-1.

Note. This repair parts and special tools list is published only for users of the Eastman Kodak, Recordak, Model PS-1, in SEA. Microfilm Viewers in other oversea commands and CONUS will be maintained through maintenance contracts with manufacturer of the basic equipment or through local purchase by individual commands.

D-2. General

The repair parts and special tools list is divided into the following sections:

a. Prescribed Load Allowance (PLA), Section II. The PLA is a consolidated listing of repair parts allocated for initial stockage at the organizational maintenance category. This is a mandatory minimum stockage allowance.

b. Repair Parts for Organizational Maintenance, Section III. Repair parts authorized for organizational maintenance are included in this section.

c. Repair Parts for Direct Support, General Support, and Depot Maintenance, Section IV. Repair parts authorized for direct support, general support, and depot maintenance are included in this section.

d. Special Tools, Test, and Support Equipment for Direct Support, General Support, and Depot Maintenance, Section V. Special tools, test equipment, and support equipment authorized for direct support and general support maintenance are included in this section. No parts authorized for depot category.

Note. All indexes noted below are cross referenced to index numbers. The index numbers appear in ascending sequence in column 1 of the repair parts list (para D-3*a*). The index number for the particular item will be the same for the item in all sections of this appendix.

e. Federal Stock Number Cross-Reference to Index Number, Section VI. This is a cross-reference index of Federal stock numbers and manufacturer's part numbers in index numbers.

f. Figure and Item Number Cross-Reference to Index Number, Section VII. This is a cross-reference index of item numbers to index numbers.

D-3. Explanation of Columns

An explanation of the columns is given below.

a. Source, Maintenance, and Recoverability Codes (SMR) and Index Numbers Column. The first line in this column lists the applicable SMR codes for the part. Listed in ascending order directly below the SMR codes is the index number assigned to the repair part.

(1) *Source code (S).* The selection status and source for the listed item is noted here. Source codes and their explanations are as follows:

Code	Explanation
P —	Applies to repair parts that are stocked in or supplied from the GSA/DSA, or Army supply system, and authorized for use at indicated maintenance categories.

Code	Explanation
M —	Applies to repair parts that are not procured or stocked but are to be manufactured at indicated maintenance categories.
X1 —	Applies to repair parts that are not procured or stocked, the requirements for which will be supplied by the use of next higher assembly or component.
X2 —	Applies to repair parts that are not stocked. The indicated maintenance category requiring such repair parts will attempt to obtain them through cannibalization; if not obtainable through cannibalization, such repair parts will be requisitioned with supporting justification through normal supply channels.

(2) *Maintenance code (M).* The lowest category of maintenance authorized to install the listed item is noted here.

Code	Explanation
C —	Operator/crew
O —	Organizational maintenance
F —	Direct support maintenance
H —	Geieral support maintenance
D —	Depot maintenance

(3) *Recoverability code (R).* The information in this column indicates whether unserviceable items should be returned for recovery or salvage. Recoverability code and its explanation is as follows:

Note. When no code is indicated in the recoverability column, the part will be considered expendable.

Code	Explanation
R —	Applies to repair parts and assemblies which are economically repairable at DSU and GSU activities and normally are furnished by supply on an exchange basis.

b. Federal Stock Number Column. The Federal stock number for the item is listed in this column.

c. Description Column. This column includes the Federal item name and any additional description of the item required, the manufacturer's part number (reference number), and the applicable five-digit Federal supply code for manufacturers (para D–5). Usable on code column is not used.

d. Unit of Issue Column. The unit used as a basis of issue (e.g., ea, pr, ft, yd, etc.) is indicated in this column.

e. Quantity Incorporated in Unit Pack Column. Not used.

f. Quantity Incorporated in Unit Column The quantity of repair parts in an assembly is given in this column.

g. Maintenance Allowances Column.

(1) The maintenance allowance columns are divided into subcolumns. The total quantity of items authorized for the number of equipments supported is indicated in this column. Items authorized for use as required, but not for initial stockage, are identified with an asterisk in the allowance column.

(2) The quantitative allowances for organizational category of maintenance represents one initial prescribed load for a 15-day period for the number of equipments supported. Units and organizations authorized additional prescribed loads will multiply the number of prescribed loads authorized by the quantity of repair parts reflected in the appropriate density column to obtain the total quantity of repair parts authorized.

(3) Subsequent changes to organizational allowances will be limited as follows: No change in the range of items is authorized. If additional items are considered necessary, recommendation should be forwarded to Commanding General, U.S. Army Electronics Command, ATTN: AMSEL–ME–NMP–RN. Fort Monmouth, N. J., 07703, for exception or revision to the allowance list. Revisions to the range of items authorized will be made by the USA ECOM National Maintenance Point based upon engineering experience, demand data, or TAERS information.

(4) The quantitative allowances for DS/GS categories of maintenance will represent initial stockage for a 30-day period for the number of equipments supported.

h. One-Year Allowance Per 100 Equipments/Contingency Planning Purposes Column. The total quantity required for distribution and contingency planning purposes is indicated in this column. The range of items indicates total quantities of all authorized items required to provide for adequate support of 100 equipments for 1 year.

i. Depot Maintenance Allowance Per 100 Equipments Column. This column indicates the total quantity of each item authorized depot maintenance for 100 equipments.

j. Illustrations Column.

(1) *Figure number (a).* The number of the illustration in which the item is shown is indicated in this column.

(2) *Item No. or reference designation (b).* The callout number used to reference the item in the illustration appears in this column.

D–4. Location of Repair Parts

a. This appendix contains two cross-reference indexes (sec. VI and VII), to be used to locate a repair part when either the Federal stock number, reference number (manufacturer's part number), or figure number is known. The first column in each cross-reference index is prepared, as applicable, in numerical or alphanumerical sequence. The last column of each cross-reference index lists the index number assigned to the part.

b. Refer to the appropriate cross-reference index (para D–2*e* and *f*), and note the index number in the last column; then refer to the repair parts list to locate the index number which is listed in ascending order in column 1 of the repair parts list.

D–5. Federal Supply Codes

This paragraph lists the Federal supply code with the associated manufacturer's name.

Code	Manufacturer
08806	General Electric Co., Miniature Lamp Dept.
19139	Eastman Kodak Co.
74353	Tapping Bros., Inc.
78553	Tinnerman Products, Inc.
89503	Eastman Kodak Co., Apparatus and Optical Division, Camera Works

SECTION II PRESCRIBED LOAD ALLOWANCE

(1) FEDERAL STOCK NUMBER	(2) DESCRIPTION / USABLE ON CODE	(3) QTY INC IN UN PK	(4) 15-DAY ORG. MAINT. ALLOWANCE (a) 1-5	(b) 6-20	(c) 21-50	(d) 51-100
5340-016-8351	FOOT, RUBBER: 72815; 89503		*	*	*	2
5961-789-3810	SEMICONDUCTOR DEVICE, DIODE: 166079; 89503		*	*	*	2
6240-548-0019	LAMP, PROJECTION: 1240; 08806		2	2	2	3

(1) SMR CODE / INDEX NO.	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION / Reference Number & Mfr Code / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 15-DAY ORGANIZATIONAL MAINTENANCE ALW (a) 1-5	(b) 6-20	(c) 21-50	(d) 51-100	(7) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
A000	6730-808-6445	VIEWER, STILL PICTURE PS-1 (This item is nonexpendable)								
P-O A012	5340-016-8351	FOOT, RUBBER: 72815; 89503	ea	4	*	*	*	2	16	13
P-O A039	6730-018-0710	MAGAZINE ASSEMBLY COMPLETE: 3827; 89503	ea	1	*	*	*	*	16	43
P-O A059	5340-016-6076	SPEED CLIP: C-3860-014-1; 78553	ea	2	*	*	*	*	17	17
P-O A060	5930-789-6035	COVER, ELECTRICAL SWITCH: 872282; 89503	ea	1	*	*	*	*	17	18
P-O A064	5355-018-4031	KNOB, CONTROL: 872259; 89503	ea	1	*	*	*	*	17	22
P-O A065	5355-018-4025	KNOB, FOCUS: 154073; 89503	ea	1	*	*	*	*	17	22A
P-O A066	5305-880-9922	SETSCREW: 4-40 x 5/16; 97988; 89503	ea	1	*	*	*	*	17	23
P-O A185	5961-789-3810	SEMICONDUCTOR DEVICE, DIODE: 166079; 89503	ea	1	*	*	*	2	19	36
P-O A194	6240-548-0019	LAMP, PROJECTION: 1240; 08806	ea	1	2	2	2	3	20	4
P-O A220	4130-803-4946	FILTER, FILM COOLING: 867451; 89503	ea	1	*	*	*	*	20	31

(1) SMR CODE / INDEX NO.	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION / REFERENCE NUMBER & MFR. CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
A000	6730-808-6445	VIEWER, STILL PICTURE PS-1 (This item is nonexpendable)												
		CABINET PARTS, MAGAZINE AND FILM SPLICER												
X1 A001		TRIM, CABINET: 872270; 89503	ea	1									16	1
X1 A002		COVER, REAR, CABINET: 872244; 89503	ea	1									16	2
X1 A003		CABINET: 872128; 89503	ea	1									16	3
P-C A004	6730-018-4517	SCREEN: 879357; 89503	ea	1	*	*	2	*	*	2	12	5	16	4
X1 A005		COVER, FILM, CHAMBER: 872245; 89503	ea	1									16	6
X1 A006		CHAMBER, FILM: 872220; 89503	ea	1									16	7
X1 A007		COVER, BOTTOM, CABINET: 872243; 89503	ea	1									16	8
M-H A008		BRACKET, CORD, RELIEF: 872281; 89503	ea	1									16	9
M-F A009		CORD SET ASSEMBLY: 872289; 89503	ea	1									16	10
P-C A010	5935-081-8025	CONNECTOR, ADAPTER: 868866; 89503	ea	1	*	*	*	*	*	*	5	2	16	11
X2-F A011		SPACER: 872246; 89503	ea	1									16	12
P-C A012	5340-016-8351	FOOT, RUBBER: 72815; 89503	ea	1	*	2	2	*	2	2	14	8	16	13
M-D A013		LABEL, WARNING: 9020718; 89503	ea	1									16	14
M-D A014		DECAL, RECORDAK: 874665; 89503	ea	1									16	15
X1 A015		MAGAZINE CASE, LOWER HALF: 872061; 89503	ea	1									16	16
X1 A016		SHAFT, ROLLER, MAGAZINE: 872055; 89503	ea	1									16	17
X1 A017		ROLLER, MAGAZINE: 872056; 89503	ea	1									16	18
P-F A018	6730-018-0884	CORE ASSEMBLY: 882462; 89503	ea	1	*	*	*	*	*	*	5	2	16	19
X1 A019		MAGAZINE CASE, UPPER HALF: 872059; 89503	ea	1									16	20
X2-F A020		SCREW-PAN, TYPE B, STEEL, NICKEL PLATED: 851960; 74353	ea	1									16	21
P-F A021	6750-018-3369	LEADER, FILM: 873176; 89503	ea	1	*	*	2	*	*	2	10	4	16	22
P-F A022	6750-018-3378	TRAILER, FILM, CLEAR: 873996; 89503	ea	2	*	*	2	*	*	2	10	4	16	23
X2-F A023		SCREW, SELF TAP: 109561; 89503	ea	1									16	24
X2-F A024		SCREW-PAN, TYPE B, STEEL, RUSTPROOF: 90100; 89503	ea	1									16	25
X2-F A025		STUD, COVER, FILM CHAMBER: 852312; 89503	ea	1									16	26
X2-F A026		STUD, COVER, REAR: 852311; 89503	ea	1									16	27
X2-F A027		SCREW-PAN, HD, STEEL, RUSTPROOF: 122759; 89503	ea	1									16	28

(1) SMR CODE / INDEX NO.	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION / REFERENCE NUMBER & MFR. CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
X2-F A028		NUT, SPEED: 852358; 89503	ea	1									16	29
X2-F A029		SCREW-PAN HD, TYPE B, STEEL, RUSTPROOF: 138773; 74353	ea	1									16	30
X2-F A030		SPEEDNUT: C-855-8A-24; 78553	ea	1									16	31
X2-F A031		SCREW-FOOT CABINET: 852309; 89503	ea	1									16	32
X2-F A032		SPEEDNUT: 1793-8-1; 78553	ea	1									16	33
X2-F A033		SCREW-BINDING HD, STEEL: 75360; 89503	ea	1									16	37
X2-F A034		SCREW-HEX SOCKET, BUTTON HD: 851248; 89503	ea	1									16	38
X2-F A035		LOCKWASHER-EXTERNAL TOOTH, STEEL, RUSTPROOF: 851423; 89503	ea	1									16	39
X2-F A036		WASHER-SUPPORT BRACKET PLATE, MECH: 852009; 89503	ea	1									16	40
X2-F A037		NUT-HEX, STEEL, RUSTPROOF: 34269; 89503	ea	1									16	41
X2-F A038		CLAMP, WIRE HARNESS: 65582; 89503	ea	1									16	42
P-O A039	6730-018-0710	MAGAZINE ASSEMBLY, COMPLETE: product No. 3827; 89503	ea	1	*	*	2	*	*	2	10	4	16	43
X1 A040		SPLICER INSTRUCTIONS: 89503	ea	1									16	44
X1 A041		SPLICING TAPE: (5 pkgs of 20 each) product No. 3803; 89503	ea	1									16	45
P-F A042	6740-018-1597	SPLICER, PHOTOGRAPHIC FILM: product No. 2808; 89503	ea	1	*	*	*	*	*	*	5	2	16	46
X2-F A043		GROMMET: 852313; 89503	ea	1									16	47
P-F A044	6750-018-3361	TAPE, SPLICING, BOX OF 1000: product No. 3832; 89503	ea	1	*	*	*	*	*	*	5	2		
		FILM CONTROL PARTS												
X2-F A045		SET SCREW-HEX SOCKET, OVAL POINT, STEEL, RUSTPROOF: 850270; 89503	ea	1									17	1
P-F A046	6730-018-1539	GUIDE ASSEMBLY, UPPER & LOWER: 883019; 89503	ea	1	*	*	*	*	*	*	5	2	17	2
X1 A047		GUIDE, FILM, SPRING: 872156; 89503	ea	1									17	4
X1 A048		SPRING, LENS BARREL: 872166; 89503	ea	1									17	5
X1 A049		FILM GUIDE ECCENTRIC SCREW: 875872; 89503	ea	1									17	7
X2-F A050		SCREW-PAN HD, STEEL, RUSTPROOF: 1141531; 89503	ea	1									17	8
X1 A051		SPRING, FOCUSING LEVER, PIVOT: 867710; 89503	ea	1									17	9
X2-F A052		WASHER-MECHANISM PLATE SUPPORT BRACKET: 852009; 89503	ea	1									17	10
X2-F A053		STUD, FOCUSING LEVER, PIVOT: 872205; 89503	ea	1									17	11
X1 A054		FOCUSING LEVER: 872739; 89503	ea	1									17	12
X2-F A055		STUD, MOTOR CONTROL LEVER: 865834; 89503	ea	1									17	13

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X- A056		FOCUSING ARM AND STUD ASSEMBLY: 872114; 89503	ea	1									17	14
X2-F A057		SPEEDNUT: C-6844-6Z-24; 78553	ea	1									17	15
X1 A058		FOCUSING ARM BRACKET: 872203; 89503	ea	1									17	16
P-C A059	5340-016-6076	SPEEDCLIP: C-3860-014-1; 78553	ea	2	*	*	*	*	*	*	5	2	17	17
P-O A060	5930-789-6035	COVER, ELECTRICAL SWITCH: 872282; 89503	ea	1	*	*	*	*	*	*	5	2	17	18
X1 A061		BRACKET: 872727; 89503	ea	1									17	19
X1 A062		STRIP, BLACK PLASTIC: 872269; 89503	ea	1									17	20
M-L A063		PLATE, NAME & DATA: 861889; 89503	ea	1									17	21
P-O A064	5355-018-4031	KNOB, CONTROL: 872259; 89503	ea	1	*	*	*	*	*	*	5	2	17	22
P-O A065	5355-018-4025	KNOB, FOCUS: 154073; 89503	ea	1	*	*	*	*	*	*	5	2	17	22A
P-O A066	5305-880-9922	SETSCREW: 97988; 89503	ea	2	*	*	*	*	*	*	5	2	17	23
P-F A067	5930-789-6036	SWITCH ASSEMBLY, MOTOR CONTROL: 877697; 89503	ea	1	*	*	2	*	*	2	8	3	17	27
X1 A068		ACTUATOR AND SHAFT ASSEMBLY, MOTOR CONTROL: 870593; 89503	ea	1									17	28
X1 A069		PIN, ROLL, STEEL: 851032; 89503	ea	1									17	29
X2-F A070		WASHER: 85876; 89503	ea	1									17	30
X1 A071		FRAME, MOTOR CONTROL UNIT: 871937; 89503	ea	1									17	31
X1 A072		LEVER CLAMP ASSEMBLY, MOTOR CONTROL: 870591; 89503	ea	1									17	32
X1 A073		LEVER CLAMP RIVET, MOTOR CONTROL: 850422; 89503	ea	1									17	33
X2-F A074	5305-719-5336	SET SCREW-HEX SOCKET, CUP POINT, STEEL NICKEL PLATE: 136229; 89503	ea	1									17	34
X2-F A075		STUD, MOTOR CONTROL LEVER: 865834; 89503	ea	1									17	35
X1 A076		LEVER COMPLETE, MOTOR CONTROL: 871907; 89503	ea	1									17	36
X1 A077		SPRING, ARMATURE, MOTOR CONTROL: 871340; 89503	ea	1									17	37
P-F A078	5950-789-8506	REACTOR, MOTOR CONTROL: 871939; 89503	ea	1	*	*	2	*	*	2	8	3	17	38
X1 A079		CHOKE RETAINER, MOTOR CONTROL: 870578; 89503	ea	1									17	39
X2-F A080		SCREW-PAN HD, STEEL, NICKEL: 123438; 89503	ea	1									17	40
X2-F A081		SPEEDNUT: C-1887-632-1; 78553	ea	1									17	41
X2-F A082		SCREW-PAN HD, STEEL NICKEL: 123438; 89503	ea	1									17	42
X2-F A083		SCREW-HEX SOCKET, BUTTON HD, STEEL, RUSTPROOF: 851875; 89503	ea	1									17	43
X2-F A084		SPEEDNUT: C-6844-6Z-24; 78553	ea	1									17	44

(1) SMR CODE / INDEX NO.	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION / REFERENCE NUMBER & MFR. CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
X2-F A085		SCREW-PAN HD, TYPE B, STEEL NICKEL PLATE: 130321; 74353	ea	1									17	45
X2-F A086		STUD, FOCUSING ARM PIVOT: 870269; 89503	ea	1									17	46
X2-F A087		STUD SPRING, FOCUSING ARM PIVOT: 852291; 89503	ea	1									17	47
X2-F A088		STUD WASHER, FOCUSING ARM PIVOT: 37982; 89503	ea	1									17	48
X2-F A089		LOCKNUT-FLEXLOC NO: 22 FT. - 1032: 852288; 89503	ea	1									17	49
X2-F A090		SCREW-PAN HD, STEEL NICKEL PLT: 122804; 89503	ea	1									17	50
X2-F A091		LOCKWASHER-EXTERNAL TOOTH, STEEL, RUSTPROOF: 78621; 89503	ea	1									17	51
X2-F A092		SCREW-PAN HD, STEEL NICKEL PLT: 122782; 89503	ea	1									17	52
X2-F A093		LOCKWASHER-INTERNAL TOOTH, STEEL, NICKEL PLT: 49402; 89503	ea	1									17	53
X2-F A094		SCREW-PAN HD, STEEL NICKEL PLT: 122808; 89503	ea	1									17	54
X2-F A095		SCREW-PAN HD, STEEL NICKEL PLT: 122811; 89503	ea	1									17	55
X2-F A096		WASHER, FLAT, STEEL, NICKEL PLATED: 54780; 89503	ea	1									17	56
X2-F A097		NUT-HEX, STEEL, NICKEL PLT: 31576; 89503	ea	1									17	57
X2-F A098		SCREW-PAN HD, STEEL, NICKEL PLT: 122713; 89503	ea	1									17	58
X2-F A099		SCREW-PAN HD, STEEL, NICKEL PLT: 122719; 89503	ea	1									17	59
X2-F A100		SPEEDNUT: C-6704-440-24; 78553	ea	1									17	60
X1 A101		COMPLETE, MOTOR CONTROL ASSEMBLY: 89503	ea	1									17	61
X1 A102		BUSHING, FRAME, MOTOR CONTROL UNIT: 871339; 89503	ea	1									17	62
P-F A103	6730-018-0904	SPRING, CONTROL LEVER: 873180; 89503	ea	1	*	*	2	*	*	2	8	3	17	63
X1 A104		COLLAR, CONTROL LEVER SPRING: 871904; 89503	ea	1									17	64
X2-F A105		SCREW, CONTROL LEVER SPRING: 122720; 89503	ea	1									17	65
X1 A106		FASTENER, MOTOR CONTROL ASSEMBLY: 851757; 89503	ea	1									17	66
		MAGAZINE CAVITY AND SWITCH PARTS												
X1 A107		ARM AND REED ASSEMBLY: 872549; 89503	ea	1									18	1
X1 A108		STUD, PRESSURE ROLLER ARM: 872186; 89503	ea	1									18	2
X2-F A109		LOCKWASHER, INTERNAL TOOTH, STEEL, RUSTPROOF: 78621; 89503	ea	1									18	3
X2-F A110		NUT-HEX, STEEL, RUSTPROOF: 42745; 89503	ea	1									18	4
P-F A111	6730-018-1681	ROLLER, PRESSURE, SHAFT ASSEMBLY: 880799; 89503	ea	1	*	*	*	*	*	*	5	2	18	5
X1 A112		CAPTURE: 876163; 89503	ea	1									18	8

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X1 A113		SWITCH, FILM TAB: 872230; 89503	ea	1									18	9
M-F A114		PAD, FRICTION: 872626; 89503	ea	1									18	10
P-F A115	5945-789-3623	SOLENOID, INTERLOCK: 874538; 89503	ea	1	*	*	2	*	*	2	8	3	18	11
X1 A116		ROD, SOLENOID, PUSH: 876191; 89503	ea	1									18	12
X1 A117		LINK, SOLENOID, DRAG: 872012; 89503	ea	1									18	13
X1 A118		LEVER, POWER FAILURE LOCKOUT: 876159; 89503	ea	1									18	14
P-F A119	5340-016-6091	SPRING, POWER FAILURE LOCKOUT LEVER: 872211; 89503	ea	1	*	*	*	*	*	*	5	2	18	15
X2-F A120		NUT, PLATE: 877440; 89503	ea	1									18	16
X1 A121		STRIPPER, PRESSUR ROLLER: 877439; 89503	ea	1									18	17
X1 A122		STIFFENER: 877441; 89503	ea	1									18	18
P-F A123	6730-018-0570	SPRING, INTERLOCK BLADE: 872248; 89503	ea	1	*	*	*	*	*	*	5	2	18	19
M-F A124		PAD, FRICTION: 872626; 89503	ea	1									18	20
X1 A125		MAGAZINE CAVITY: 872678; 89503	ea	1									18	21
M-F A126		PAD, FRICTION: 872626; 89503	ea	1									18	22
X1 A127		PIVOT, INTERLOCK BLADE: 872256; 89503	ea	1									18	23
X1 A128		INTERLOCK, BLADE: 872676; 89503	ea	1									18	24
X2-F A129		SPEEDNUT-STEEL: 6069-632-1; 78553	ea	1									18	25
P-F A130	5930-789-6038	SWITCH, MAGAZINE LOCATING: 872226; 89503	ea	1	*	*	2	*	*	2	8	3	18	26
X1 A131		COVER, SWITCH: 866395; 89503	ea	1									18	27
X1 A132		LINK, MAGAZINE LOCATING SWITCH: 872219; 89503	ea	1									18	28
P-F A133	5930-789-6037	SWITCH, SENSITIVE: 872225; 89503	ea	1	*	*	2	*	*	2	8	3	18	29
X2-F A134		SCREW, SELF TAP: 162999; 89503	ea	1									18	30
X2-F A135		SCREW, CAVITY TO MECHANISM PLATE: 852334; 89503	ea	1									18	31
X2-F A136		LOCKWASHER, INTERNAL TOOTH: 55980; 89503	ea	1									18	32
X2-F A137		SNAPNUT, CAVITY TO MECHANISM PLATE: 852304; 89503	ea	1									18	33
X2-F A138		SCREW-PAN HEAD, STEEL, RUSTPROOF: 125525; 89503	ea	1									18	34
X2-F A139		WASHER, FLAT, STEEL, NICKEL PLT: 62858; 89503	ea	1									18	35
X2-F A140		SCREW-PAN HEAD, STEEL, RUSTPROOF: 851481; 89503	ea	1									18	36
X2-F A141		SCREW-HEX, SOCKET HD, CAP, STEEL, RUSTPROOF: 60402; 89503	ea	1									18	37

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	X2-F A142		LOCKWASHER, SPRING STEEL, RUSTPROOF: 78628; 89503	ea	1									18	38
	X2-F A143		WASHER-FLAT STEEL, RUSTPROOF: 95533; 89503	ea	1									18	39
	X2-F A144		SCREW, SELF TAP: 109561; 89503	ea	1									18	40
	X2-F A145		SPEEDNUT, TYPE U: C-6187-4Z-24; 89503	ea	1									18	41
	X2-F A146		SCREW-PAN HEAD, STEEL, RUSTPROOF: 122793; 89503	ea	1									18	42
	X2-F A147		SCREW-PAN HEAD, STEEL NICKEL PLT: 122804; 89503	ea	1									18	43
	X2-F A148		SCREW-PAN HEAD, STEEL, RUSTPROOF: 50128; 89503	ea	1									18	44
	X2-F A149		WASHER: 140144; 89503	ea	1									18	45
	X2-F A150		WASHER, LOCK: 105420; 89503	ea	1									18	46
	X2-F A151		NUT: 057155; 89503	ea	1									18	47
			PRINTED CIRCUIT AND WIRING PARTS												
	X2-F A152		NUT-HEX, STEEL: 42533; 89503	ea	1									19	1
	X2-F A153		LOCKWASHER-INTERNAL TOOTH: 69682; 89503	ea	1									19	2
	X2-F A154		STUD: 872528; 89503	ea	1									19	3
	P-F A155	6130-789-3613	RECTIFIER, METALIC: 852485; 89503	ea	1	*	*	2	*	*	2	8	3	19	4
	X1 A156		CLAMP, TAKE-UP MOTOR CAPACITOR: 151753; 89503	ea	1									19	5
	P-F A157	5910-789-6475	CAPACITOR, MOTOR: 852484; 89503	ea	1	*	*	2	*	*	2	8	3	19	6
	X2-F A158		INSULATOR, TERMINAL STRIP: 872531; 89503	ea	1									19	7
	X2-F A159		INSULATOR, TERMINAL STRIP: 872532; 89503	ea	1									19	7A
	X1 A160		STRIP, MOTOR OR TRANSFORMER TERMINAL: 872237; 89503	ea	1									19	8
	X1 A161		DIVIDER, TERMINAL STRIP: 872260; 89503	ea	1									19	9
	M-H A162		MOUNTING BRACKET, PRINTED CIRCUIT: 872274; 89503	ea	1									19	10
	P-F-H A163	6730-018-1634	CIRCUIT CARD ASSEMBLY: 876026; 89503	ea	1	*	2	2	*	2	2	8	3	19	11
	X2-F A164		CLAMP, CAPACITOR: 153643; 89503	ea	1									19	12
	P-F A165	5905-926-8809	RESISTOR, TAKE-UP MOTOR: 153854; 89503	ea	2	*	2	2	*	2	2	13	6	19	15
	P-F A166	6730-018-1337	FILM TAB AND CLUTCH RELAY ASSEMBLY: 881555; 89503	ea	1	*	*	2	*	*	2	8	3	19	16
	P-F A167	5945-789-3624	RELAY MOTOR TRANSFER ASSEMBLY: 874502; 89503	ea	1	*	*	2	*	*	2	8	3	19	17
	X1 A168		STRIP, PANEL UNDERSIDE TERMINAL: 872235; 89503	ea	1									19	18
	X2-F A169		INSULATOR, PANEL UNDERSIDE: 872491; 89503	ea	1									19	19

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X2-F A17		INSULATOR, PANEL TOP SIDE, LEFT: 872254; 89503	ea	1									19	20
X1 A171		STRIP, PANEL TOP SIDE TERMINAL: 872236; 89503	ea	1									19	21
X1 A172		INSULATOR, PANEL TOP SIDE RIGHT: 872253; 89503	ea	1									19	22
P-F A173	5905-789-5053	RESISTOR, ELECTRICAL: 872673; 89503	ea	1	*	*	2	*	*	2	8	3	19	23
X2-F A174		SCREW-ROUND HEAD, BRASS, NO. 6-32 x 1/4: 13316; 89503	ea	1									19	24
X2-F A175		LOCKWASHER-INTERNAL TOOTH: 55776; 89503	ea	1									19	25
X2-F A176		NUT-HEX, STEEL: 42533; 89503	ea	1									19	26
X2-F A177		SCREW-PAN HEAD: 138771; 89503	ea	1									19	27
X2-F A178		SCREW-PAN HD, STEEL, NICKEL PLATED, NO. 6-32 x 1/4: 122691; 89503	ea	1									19	28
X2-F A179		LOCKWASHER-EXTERNAL TOOTH: 121213; 89503	ea	1									19	29
X2-F A180		SCREW-PAN HD, STEEL, RUSTPROOF: 122759; 89503	ea	1									19	30
P-F A181	5905-926-8808	RESISTOR, CLUTCH SOLENOID (FORMED): 872344; 89503	ea	1	*	*	2	*	*	2	8	3	19	32
P-F A182	5961-789-3809	SEMICONDUCTOR DEVICE DIODE: 166305; 89503	ea	5	2	2	2	2	2	2	53	50	19	33
P-F A183	5905-926-8807	RESISTOR, FIXED COMPOSITION: 872341; 89503	ea	2	*	*	2	*	*	2	8	4	19	34
P-F A184	5910-789-6491	CAPACITOR, CLUTCH (ELECTROLYTIC): 872199; 89503	ea	1	*	2	2	*	2	2	12	5	19	35
P-O A185	5961-789-3810	SEMICONDUCTOR DEVICE, DIODE: 166079; 89503	ea	1	*	2	2	*	2	2	12	5	19	36
P-F A186	5905-926-8811	RESISTOR-CONTROL CIRCUIT CURRENT LIMITING: 872343; 89503	ea	1	*	*	2	*	*	2	8	3	19	38
P-F A187	5905-789-5056	RESISTOR, CURRENT LIMITING 7.5 OHMS: 155255; 89503	ea	1	*	*	2	*	*	2	8	3	19	39
X2-F A188		SPEEDNUT: 162272; 89503	ea	1									19	41
X2-F A189		SCREW FOR RELAY 874502: 131290; 89503	ea	1									19	42
P-F A190		CONNECTOR, RECEPTACLE, ELECTRICAL P/O FIG. 19-11	ea	1	*	*	2	*	*	2	8	3	19	
		ILLUMINATION AND VENTILATING PARTS												
X1 A191	6730-018-4520	LAMPHOUSE COVER ASSEMBLY: 872109; 89503	ea	1									20	1
P-H A192	6760-018-0327	LENS, CONDENSER, PHOTOGRAPHIC: 819683; 89503	ea	1				*	*	2	8	3	20	2
P-H A193	6760-017-9729	LENS, CONDENSER, PHOTOGRAPHIC: 819684; 89503	ea	1				*	*	2	8	3	20	3
P-O A194	6240-548-0019	LAMP, PROJECTION: 1240; 08806	ea	1	2	3	6	2	2	2	64	50	20	4
P-F A195	6760-017-9727	REFLECTOR: 804823; 89503	ea	1	*	*	*	*	*	*	5	2	20	5
M-H A196		BRACKET, CONDENSER: 872161; 89503	ea	1									20	6
X1 A197		LAMPHOUSE: 872162; 89503	ea	1									20	7

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X1 A198		STOP, CHAMBER, FILM: 872218; 89503	ea	1									20	8
M-H A199		PLATE, SUPPORT, LAMPHOUSE: 872157; 89503	ea	1									20	9
P-F A200	4140-803-4792	FAN: 872627; 89503	ea	2	*	*	2	*	*	2	10	4	20	10
X2-F A201		GROMMET: 869276; 89503	ea	1									20	11
X2-F A202		SCREW, SET #8/32 x 3/16: 121177; 89503	ea	1									20	12
P-H A203	6105-789-3620	MOTOR, FAN, LAMP COOLING: 138733; 89503	ea	2				*	2	2	13	6	20	13
P-F A204	5905-789-5078	RESISTOR, FAN COOLING: P/o fig. 20-13; 160130; 89503	ea	1	*	*	2	*	*	2	8	3	20	
P-F A205	5950-789-8510	TRANSFORMER ASSEMBLY, LAMP: 872127; 89503	ea	1	*	*	2	*	*	2	8	3	20	14
P-F A206	6730-018-1927	SPRING, ADJUSTING, MIRROR: 863186; 89503	ea	6	*	2	2	*	2	2	11	6		15
M-H A207		BRACKET, SUPPORT, MIRROR: 872163; 89503	ea	1									20	16
X1 A208		ASSEMBLY, PLATE AND PAD, MOUNT, MIRROR: 865125; 89503	ea	1									20	17
X1 A209		CLAMP, MIRROR: 862766; 89503	ea	1									20	18
X1 A209A		MIRROR: 804170; 89503	ea	1									20	19
X1 A210		CLIP, LAMP, SPARE: 871392; 89503	ea	1									20	20
X1 A211		DUCT, AIR, SMALL: 872740; 89503	ea	1									20	21
1 A212		PLATE, MECHANISM: 872195; 89503	ea	1									20	22
X2-F A213		CLAMP, WIRE HARNESS: 65582; 89503	ea	1									20	23
X2-F A214		CLAMP, HARNESS, WIRE: 65583; 89503	ea	1									20	24
M-H A215		BRACKET, MECHANISM PLATE SUPPORT: 872096; 89503	ea	1									20	25
X1 A216		DUCT, AIR, LARGE: 872261; 89503	ea	1									20	26
X2-F A217		SPACER, MOTOR, FAN: 866057; 89503	ea	1									20	27
M-H A218		BRACKET, MOTOR SUPPORT, FAN: 872495; 89503	ea	1									20	28
X2-F A219		LOCKNUT, RUSTPROOF, NO. 6-32 x 1/4: 145101; 89503	ea	1									20	29
P-F A220	4130-803-4946	FILTER, FILM COOLING: 867451; 89503	ea	1	*	*	2	*	*	2	8	3	20	31
X1 A221		SPRING, FILTER, FILM COOLING: 872487; 89503	ea	1									20	32
X1 A222		SUPPORT, CABINET: 872273; 89503	ea	1									20	33
X2-F A223		SCREW, MOUNTING, AIR DUCT: 852334; 89503	ea	1									20	34
X2-F A224		LOCKWASHER-INTERNAL TOOTH: 55980; 89503	ea	1									20	35
X2-F A225		SNAPNUT, NYLON (AIR DUCT TO MECHANISM PLATE): 852304; 89503	ea	1									20	36

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X -F A245		SCREW-PAN HD, STEEL, RUSTPROOF NO. 10-32 x 1-1/4: 122763; 89503	ea	1									20	37
X -F A246		NUT-HEX, STEEL, RUSTPROOF: 42745; 89503	ea	1									20	38
X -F A247		LOCKWASHER-INTERNAL TOOTH, STEEL, RUSTPROOF NO. 10: 140141; 89503	ea	1									20	39
X -F A248		SCREW-PAN HD, STEEL, RUSTPROOF, NO. 10-32 x 5/8: 122769; 89503	ea	1									20	40
X -F A249		LOCKWASHER-EXTERNAL TOOTH, STEEL, RUSTPROOF: 78621; 89503	ea	1									20	41
X -F A250		WASHER, SUPPORT BRACKET, PLATE, MECH.: 852009; 89503	ea	1									20	42
X -F A251		SCREW-HEX SOCKET, BUTTON HD, 1/4-20 x 3/4: 851248; 89503	ea	1									20	43
X -F A252		LOCKWASHER-EXTERNAL TOOTH, STEEL, RUSTPROOF: 851423; 89503	ea	1									20	44
X -F A253		NUT-HEX, STEEL, RUSTPROOF: 34269; 89503	ea	1									20	45
X -F A254		SCREW-PAN HD, STEEL, RUSTPROOF: 124225; 89503	ea	1									20	46
X -F A255		SPEEDNUT: C-7000-832-1; 78553	ea	1									20	47
X -F A256		SCREW-PAN HD, STEEL, RUSTPROOF, NO. 6-32 x 3/4: 122819; 89503	ea	1									20	48
X -F A257		LOCKWASHER-EXTERNAL TOOTH: 121213; 89503	ea	1									20	49
X -F A258		NUT-HEX, STEEL: 42533; 89503	ea	1									20	50
X -F A259		SCREW-PAN HD: 138771; 74353	ea	1									20	51
X -F A260		LOCKWASHER-INT. TOOTH: 55776; 89503	ea	1									20	52
X -F A261		SCREW-BINDING HD, STEEL, RUSTPROOF: 75342; 89503	ea	1									20	53
X -F A262		LOCKWASHER-INT. TOOTH: 69682; 89503	ea	1									20	54
X -F A263		SCREW-WASHER HD, BRASS, NO. 10-32 x 7/16: 98154; 89503	ea	1									20	55
X -F A264		SCREW-BINDING HD, STEEL: 75360; 89503	ea	1									20	56
X -F A265		SCREW-PAN HD, STEEL, RUSTPROOF: 122759; 89503	ea	1									20	57
X -F A266		SCREW-PAN HD, TYPE B, RUSTPROOF, NO. 10-3/4: 852052; 74353	ea	1									20	58
X -F A267		SPEEDNUT, TYPE U: C-1226-10Z-1; 78553	ea	1									20	59
X -F A268		WASHER, FAN MOUNT: 871475; 89503	ea	1									20	60
M-F A269		PAD, MIRROR: 872497; 89503	ea	1									20	61
X -F A270		SCREW-PAN HD, TYPE B, STEEL, RUSTPROOF: 138773; 74353	ea	1									20	62
X -F A271		SCREW-PAN HD, STEEL, RUSTPROOF: 851481; 89503	ea	1									20	63
X -F A272		SCREW-PAN HD, TYPE B: 852303; 74353	ea	1									20	64
X -F A273		SPEEDNUT: C-9175-10Z-1; 78553	ea	1									20	65

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XI A255		ROLL PIN-STEEL 3/32 x 3/8: 851041; 89503	ea	1									20	66
		FILM DRIVE MOTOR ASSEMBLY PARTS												
-H 256	6730-018-2536	SOLENOID, CLUTCH: 871938; 89503	ea	1				*	*	2	8	3	21	1
XI A257		PLATE, MOUNTING, SOLENOID: 872191; 89503	ea	1									21	2
X2-F A258		LOCKNUT: 852359; 89503	ea	1									21	3
P-H A259	3020-880-0734	CHAIN, DRIVE: 872233; 89503	ea	1				*	*	2	8	3	21	4
P-H A260	6730-018-2027	CLUTCH SPROCKET ASSEMBLY: 877869; 89503	ea	1				*	*	2	8	3	21	5
XI A261		CLUTCH SUPPORT ASSEMBLY: 877873; 89503	ea	1									21	6
XI A262		PLATE, MOUNTING, MOTOR: 877086; 89503	ea	1									21	7
X2-F A263		SPACER, MOTOR MOUNTING PLATE, DRIVE: 867792; 89503	ea	1									21	8
X2-F A264		GROMMET, MOTOR MOUNTING, DRIVE: 867791; 89503	ea	1									21	9
X2-F A265		WASHER, MOTOR MOUNTING PLATE, DRIVE: 67440; 89503	ea	1									21	10
X2-F A266		SCREW, SET, ROLLER DRIVE: 128032; 89503	ea	1									21	11
P-F A267	6730-018-2284	ROLLER, DRIVE: 876649; 89503	ea	1	*	*	*	*	*	*	5	2	21	12
M-H A268		STRAP, RETAINING, MOTOR: 872625; 89503	ea	1									21	13
-F 69	5340-016-6809	SPRING, RETAINER, SHOE, DRAG: 872486; 89503	ea	1	*	*	*	*	*	*	5	2	21	14
A270		DRUM, SHOE, DRAG: 868826; 89503	ea	1									21	15
X2-F A271		SOCKET, SET SCREW-HEX, CUP POINT, STEEL, NICKEL PLATED 6-32 x 1/8: 67639; 89503	ea	1									21	16
P-F A272	4920-775-6940	SHOE, DRAG: 814772; 89503	ea	2	*	*	2	*	*	2	8	4	21	17
XI A273		RETAINER, SHOE, DRAG: 814769; 19139	ea	1									21	18
M-H A274		BRACKET, MOTOR MTG., TAKE-UP: 872635; 89503	ea	1									21	19
M-H A275		PLATE, MOTOR MTG., TAKE-UP: 876186; 89503	ea	1									21	20
X2-F A276		SETSCREW: 75649; 89503	ea	1									21	21
P-H A277	5930-789-6039	SWITCH, MOTOR PROTECTION: 872223; 89503	ea	1	*	*	2	*	*	2	8	3	21	22
P-F A278	5930-789-6040	SWITCH, SENSITIVE: 97559; 89503	ea	1	*	*	2	*	*	2	8	3	21	23
P-F-R A279	6105-789-3619	MOTOR, TAKE-UP: 876149; 89503	ea	1	*	*	2	*	*	2	8	3	21	24
XI A280		PLATE, CLUTCH: 874236; 89503	ea	1									21	25
XI A281		PIN, ROLL: 851034; 89503	ea	1									21	25A
-R 2	6105-789-3621	MOTOR, AC: 882641; 89503	ea	1				*	*	2	8	3	21	26

(1) SMR CODE / INDEX NO.	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION / REFERENCE NUMBER & MFR. CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
P-H A283	6730-018-1711	WORM, MOTOR; HIGH SPEED: 9001249; 89503	ea	1				*	*	2	8	3	21	27
X1 A284		PIN, ROLL, WORM: 851445; 89503	ea	1									21	28
X1 A285		GASKET, HOUSING, REDUCTION: 89503	ea	1									21	29
H-H A286		PLATE, MOUNTING, HOUSING REDUCTION: 89503	ea	1									21	30
X2-F A287		SPACER, GEAR, WORM: 876156; 89503	ea	1									21	31
P-H A288	6730-018-1664	GEAR, WORM, HIGH SPEED MOTOR: 9001248; 19139	ea	1				*	*	*	5	2	21	32
P-H A289	5305-719-5336	SET SCREW, GEAR WORM: 136229; 89503	ea	1				*	*	*	5	2	21	33
X2-F A290		SHIM: 104600; 89503	ea	1									21	34
X1 A291		HOUSING, GEAR, REDUCTION: 89503	ea	1									21	35
X1 A292		PLUG, GEAR HOUSING SCREW, REDUCTION: 89503	ea	1									21	36
X2-F A293		WASHER, NYLON: 869634; 89503	ea	1									21	37
F-F A294	5977-802-8721	CAP, BRUSH: 9001240; 89503	ea	2	*	*	2	*	*	2	8	4	21	38
P-F A295	5977-802-8725	BRUSH ASSEMBLY: 9001236; 89503	ea	2	*	2	2	2	2	2	29	20	21	39
X1 A296		SHAFT MINI-CLUTCH: 877634; 89503; W/ Shaft Ratchet Clutch 877787; & Shaft Ratchet Clutch (cut down) 9028159	ea	1									21	40
X1 A297		HOUSING, MINI-CLUTCH: 876155; 89503; w/ Hub & Pawl 879360	ea	1									21	41
X1 A298		RING "E": 149879; 89503	ea	1									21	42
X1 A299		PIN, ROLL: 9001259; 89503	ea	1									21	43
X1 A300		ASSEMBLY, SPROCKET SHAFT, MOTOR, LOW SPEED: 89503	ea	1									21	44
X1 A301		SPROCKET, MOTOR, LOW SPEED: 872232; 89503	ea	1									21	45
X1 A302		PIN, ROLL, STEEL, 5/64 x 3/4: 851038; 89503	ea	1									21	46
X1 A303		GEAR, WORM, MOTOR, LOW SPEED: 9001246; 89503	ea	1									21	47
X1 A304		WORM, MOTOR, LOW SPEED: 9001247; 89503	ea	1									21	48
X2-F A305		SCREW-PAN HD, STEEL, NICKEL PLATED, NO. 8-32 x 1-3/4: 852387; 89503	ea	1									21	49
X2-F A306		LOCKWASHER, INTERNAL TOOTH: 55980; 89503	ea	1									21	50
X2-F A307		SPACER, MOUNTING PLATE, SOLENOID: 871820; 89503	ea	1									21	51
X2-F A308		NUT-HEX, STEEL, NICKEL PLATED: 31576; 89503	ea	1									21	52
X1 A309		SPRING, PLATE, SOLENOID: 863802; 89503	ea	1									21	53
X2-F A310		SCREW, RETAINING STRAP, MOTOR: 151601; 89503	ea	1									21	54

(1) SMR CODE / INDEX NO.	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION / REFERENCE NUMBER & MFR. CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
X2-F A311		LOCKWASHER-INT. TOOTH, STEEL, RUSTPROOF: 140141; 89503	ea	1										
X2-F A312		SCREW-PAN HD, STEEL, RUSTPROOF, NO. 10-32 x 7/8: 851480; 89503	ea	1										
X2-F A313		LOCKWASHER-EXT. TOOTH, STEEL, RUSTPROOF: 78621; 89503	ea	1										
X2-F A314		WASHER, MOUNTING, MOTOR, DRIVE: 852473; 89503	ea	1										
X2-F A315		NUT-HEX, STEEL, RUSTPROOF: 42745; 89503	ea	1										
X2-F A316		SCREW-PAN HD, STEEL, RUSTPROOF, NO. 10-32 x 1/4: 851745; 89503	ea	1										
X2-F A317		WASHER, PLAIN: 155225; 89503	ea	1										
X2-F A318		SCREW-CAP, HEX SOCKET HD, STEEL, NICKEL PLT. NO. 6-32 x 1/4: 851247; 89503	ea	1										
X2-F A319		LOCKWASHER-INT. TOOTH, STEEL, NICKEL PLT. NO. 6: 55776; 89503	ea	1										
X2-F A320		SCREW, MOTOR MOUNT, TAKE-UP: 851330; 89503	ea	1										
X2-F A321		WASHER-FLAT, STEEL, RUSTPROOF NO. 10: 57964; 89503	ea	1										
X2-F A322		SCREW-PAN HD, STEEL, RUSTPROOF NO. 6-32 x 1-3/4: 851488; 89503	ea	1										
X2-F A323		WASHER-FLAT, STEEL, NICKEL PLT: 62858; 89503	ea	1										
X2-F A324		SPEEDNUT, STEEL: 6069-632-1; 78553	ea	1										
X2-F A325		SCREW-PAN HEAD, STEEL, RUSTPROOF: 122793; 89503	ea	1										
X2-F A326		LOCKWASHER-EXTERNAL TOOTH, STEEL, RUSTPROOF: 78621; 89503	ea	1										
X1-F A327		PIN, ROLL-STEEL: 851032; 89503	ea	1										
P-H A328	6105-789-3746	MOTOR, LOW SPEED: 872119; 89503	ea	1				*	*	*	8	3	21	76
X2-F A329		STUD: 873249; 89503	ea	1									21	77
X1 A330		SPRING, CLUTCH ADJ: 170973; 89503	ea	1									21	78
X1 A331		NYLINER: 151781; 89503	ea	1									21	79
X2-F A332		WASHER, FLAT, STEEL, NICKEL PLATED: 54780; 89503	ea	1									21	80
X2-F A333		WASHER, SPLIT RING LOCK: 136268; 89503	ea	1									21	81
X2-F A334		NYLOCK, NUT: 166446; 89503	ea	1									21	82
X1 A335		MAGNET, CLUTCH: 876147; 89503	ea	1									21	83
P-F A336	5977-802-8728	BRUSH: 9001635; 89503	ea	2	*	*	2	*	*	2	20	10	21	84
P-F A337	5977-802-8733	SPRING: 9001636; 89503	ea	2	*	*	2	*	*	2	8	4	21	85

(1) SMR CODE / INDEX NO.	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION / REFERENCE NUMBER & MFR. CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
		PS-1 COMPONENTS												
X1 A338	6730-018-4519	MOUNT & BRACKET ASSEMBLY, MIRROR: 872709; 89503	ea	1									22	1
P-C A339	6730-018-1940	PRISM ASSEMBLY: 872702; 89503	ea	1				*	*	2	8	3	22	2
X1 A340		MOUNT, PRISM, BRACKET ASSEMBLY: 872755; 89503	ea	1									22	3
X1 A341		PLATE, NAME, (THY): 861901; 89503	ea	1									22	5
X1 A342		PLATE, NAME (SCR): 861951; 89503	ea	1									22	5A
X1 A343		BRACKET: 872727; 89503	ea	1									22	6
X1 A344		BEARING: 872728; 89503	ea	1									22	7
X1 A345		PIN, ROLL: 851547; 89503	ea	1									22	8
		PRISM AND MIRRORS												
P-H A346	6730-018-1357	MIRROR, LARGE: 872732; 89503	ea	1				*	*	2	8	3	23	1
X1 A347		MOUNT, MIRROR, LARGE: 872729; 89503	ea	1									23	2
X1 A348		CLAMP, MIRROR: 862766; 89503	ea	6									23	3
X1 A349		BRACKET, MIRRORS MOUNTING: 872742; 89503	ea	1									23	4
P-H A350	6730-018-1417	MIRROR, READER, MICROFILM: 872731; 89503	ea	1				*	*	2	8	3	23	5
X1 A351		MOUNT, SMALL MIRROR: 872730; 89503	ea	1									23	6
X1 A352		PIVOT, LARGE MIRROR BRACKET: 872744; 89503	ea	1									23	7
M-F A353		PAD, MIRROR: 872497; 89503	ea	6									23	8
X1 A354		MOUNT, PRISM: 873239; 89503	ea	1									23	9
X1 A355		LENS, OBJECTIVE: 830420; 89503	ea	1									23	10
X1 A356		PRISM ASSEMBLY: 872703; 89503	ea	1									23	11
P-H A357	6760-017-9728	LENS, COMPENSATING: 830426; 89503	ea	1				*	*	2	8	3	23	12
X1 A358		STUD, PRISM ADJUSTING: 872720; 89503	ea	1									23	13
X1 A359		SPRING, LENS RETAINING: 872746; 89503	ea	1									23	14
X1 A360		SPRING, PRISM: 872704; 89503	ea	1									23	15
X2-F A361		SCREW, PRISM SPRING: 122702; 89503	ea	2									23	16
X2-F A362		SCREW, PRISM SPRING, L.W.: 62083; 89503	ea	2									23	17
X2-F A363		PAD, LIGHT BAFFLE: 865868; 89503	ea	1									23	18
X2-F A364		RING, "E": 851198; 89503	ea	2									23	19

(1) SMR CODE / INDEX NO.	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION / REFERENCE NUMBER & MFR. CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
X1 A365		SHAFT, PRISM: 865475; 89503	ea	1									24	20
X2-F A366		SET SCREW, LENS: 109128; 89503	ea	2									24	21
X2-F A367		SCREW, BRACKET MOUNTING: 852303; 89503	ea	4									24	22
X2-F A368		SPEEDNUT, BRACKET MOUNTING SCREW: 852301; 89503	ea	2									24	23
X1 A369		SPRING, MIRROR ADJUSTING: 863186; 89503	ea	3									24	24
X2-F A370		SCREW, MIRROR ADJUSTING: 124225; 89503	ea	3									24	25
X2-F A371		LOCKWASHER, INTERNAL TOOTH: 69682; 89503	ea	12									24	26
X2-F A372		SCREW, MIRROR CLAMP: 75342; 89503	ea	12									24	27
X2-F A373		PIN: 851030; 89503	ea	2									24	28
X2-F A374		SCREW, BRACKET LOCKING: 851745; 89503	ea	2									24	29
X2-F A375		WASHER, BRACKET LOCKING SCREW: 852743; 89503	ea	2									24	30
X1 A376		FASTENER, MIRROR BRACKET PIVOT: 151373; 89503	ea	2									24	31
X2-F A377		PIN, ROLL: 141536; 89503	ea	1									24	32
X1 A378		PRISM ASSEMBLY: 872702; 89503	ea	1									24	33
		PRISM ROTATING BRACKET												
X-F A379	3020-880-0735	CHAIN: 872736; 89503	ea	1	*	*	2	*	*	2	8	2	24	1
X-F A380	6730-018-1600	SPROCKET, W/SET SCREWS: 861465; 89503	ea	1	*	*	*	*	*	*	5	2	24	2
X2-F A381		SET SCREW: 90236; 89503	ea	2									24	3
M-H A382		BRACKET: 872735; 89503	ea	1									24	4
X2-F A383		RING "E": 851148; 89503	ea	1									24	5
X1 A384		SHAFT PRISM, ROTATING: 872734; 89503	ea	1									24	6
X2-F A385		PIN, ROLL: 851547; 89503	ea	1									24	7
P-F A386	5305-880-9890	SET SCREW: 117223; 89503	ea	1	*	*	*	*	*	*	5	2	24	8
P-F A387	5355-018-4038	KNOB: 872712; 89503	ea	1	*	*	*	*	*	*	5	2	24	9
P-F A388	6730-018-1679	BEARING, NYLINER: 151379; 89503	ea	2	*	*	*	*	*	*	5	2	24	10
X2-F A389		SCREW, CHAIN ADJUSTING: 851242; 89503	ea	1									24	11
X2-F A390		SPACER: 872737; 89503	ea	1									24	12
X1 A391		STUD: 872186; 89503	ea	1									24	13
X2-F A392		LOCKWASHER: 78621; 89503	ea	1									24	14

(1) SMR CODE / INDEX NO.	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION / REFERENCE NUMBER & MFR. CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(7) 30-DAY GS MAINT ALLOWANCE (a) 1-20	(b) 21-50	(c) 51-100	(8) 1 YR ALW PER EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS (a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
XB-F A393		NUT, HEX, STEEL, RUSTPROOF: 42745; 89503	ea	1									24	15

(1) SMR CODE	(2) FEDERAL STOCK NUMBER	(3) DESCRIPTION REFERENCE NUMBER & MFR. CODE / USABLE ON CODE	(4) UNIT OF MEAS	(5) QTY INC IN UNIT	(6) 30-DAY DS MAINT ALLOWANCE			(7) 30-DAY GS MAINT ALLOWANCE			(8) 1 YR ALW PER 100 EQUIP CNTGCY	(9) DEPOT MAINT ALW PER 100 EQUIP	(10) ILLUSTRATIONS	
					(a) 1-20	(b) 21-50	(c) 51-100	(a) 1-20	(b) 21-50	(c) 51-100			(a) FIG NO.	(b) ITEM NO. OR REFERENCE DESIGNATION
P-F	6670-089-9643	SCALE 12 OZ	ea	1			1			1				
P-F	6730-018-4503	HEIGHT & LEVEL GAGE	ea	1			1			1				

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5305-719-5336	A289
5305-880-9890	A386
5305-880-9922	A066
5340-016-6076	A059
5340-016-6091	A119
5340-016-6809	A269
5340-016-8351	A012
5355-018-4025	A065
5355-018-4031	A064
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5905-789-5053	A173
5905-789-5056	A187
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5905-926-8811	A186
5910-789-6475	A157
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5930-789-6035	A060
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5930-789-6039	A277
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5935-081-8025	A010
5945-789-3623	A115
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5950-789-8506	A078
5950-789-8510	A205
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5977-802-8721	A294
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6130-789-3613	A155
6240-548-0019	A194
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6730-018-0710	A039
6730-018-0884	A018
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6730-018-1539	A046
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6730-018-4519	A338
6730-018-4520	A191
6730-808-6445	A000
6740-018-1597	A042
6750-018-3361	A044
6750-018-3369	A021
6750-018-3378	A022
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C-6704-440-24	A100
C-6844-6Z-24	A057
C-7000-832-1	A236
C-855-8A-24	A030
C-9175-10Z-1	A254
057155	A151
104600	A290
105420	A150
109128	A366
109561	A023
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121213	A179
122691	A178
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122713	A098
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138773	A029
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60402	A141
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65582	A038
65583	A214
67440	A265
67639	A271
69682	A153
75342	A242
75360	A033
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830420	A355
850270	A045
850422	A073
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851875	A083
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852309	A031
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852313	A043
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868826	A270
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872056	A017
872059	A019
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872114	A056
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872549	A107
872625	A268
872626	A114
872635	A274
872676	A128
872678	A125
872702	A378
872703	A356
872704	A360
872720	A358
872727	A061
872728	A344
872729	A347
872730	A351
872734	A384
872735	A382
872737	A390
872739	A054
872740	A211
872742	A349
872744	A352
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873249	A329
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875872	A049
876147	A335
876155	A297
876156	A287
876159	A118
876163	A112

REF NUMBER	INDEX NO.	FEDERAL STOCK NUMBER	INDEX NO.	FEDERAL STOCK NUMBER	INDEX NO.
876186	A275				
876191	A116				
877086	A262				
877439	A121				
877440	A120				
877441	A122				
877634	A296				
877787	A296				
877873	A261				
879360	A297				
9001246	A203				
9001247	A304				
9001259	A299				
9001635	A336				
90100	A024				
9020718	A013				
90236	A381				
9028159	A296				
95533	A143				
98154	A244				

SECTION VII. INDEX-FIGURE AND ITEM NUMBER CROSS REFERENCE TO INDEX NUMBER (CONTINUED)

FIG. NO.	ITEM NO. OR REFERENCE DESIGNATION	INDEX NO.
16	1	A001
	2	A002
	3	A003
	4	A004
	6	A005
	7	A006
	8	A007
	9	A008
	10	A009
	11	A010
	12	A011
	13	A012
	14	A013
	15	A014
	16	A015
	17	A016
	18	A017
	19	A018
	20	A019
	21	A020
	22	A021
	23	A022
	24	A023
	25	A024
	26	A025
	27	A026
	28	A027
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	31	A030
	32	A031
	33	A032
	37	A033
	38	A034
	39	A035
	40	A036
	41	A037
	42	A038
	43	A039
	44	A040
	45	A041
	46	A042
	47	A043
17	1	A045
	2	A046
	4	A047
	5	A048
	7	A049
	8	A050
	9	A051
	10	A052
	11	A053
	12	A054
	13	A055
	14	A056
	15	A057
	16	A058
	17	A059
	18	A060
	19	A061
	20	A062
	21	A063
	22	A064
	22A	A065

FIG. NO.	ITEM NO. OR REFERENCE DESIGNATION	INDEX NO.
	23	A066
	27	A067
	28	A068
	29	A069
	30	A070
	31	A071
	32	A072
	33	A073
	34	A074
	35	A075
	36	A076
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	40	A080
	41	A081
	42	A082
	43	A083
	44	A084
	45	A085
	46	A086
	47	A087
	48	A088
	49	[illegible]
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	51	A091
	52	A092
	53	A093
	54	A094
	55	A095
	56	A096
	57	A097
	58	A098
	59	A099
	60	A100
	61	A101
	62	A102
	63	A103
	64	A104
	65	A105
	66	A106
18	1	A107
	2	A108
	3	A109
	4	A110
	5	A111
	8	A112
	9	A113
	10	A114
	11	A115
	12	A116
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	14	A118
	15	A119
	16	A120
	17	A121
	18	A122
	19	A123
	20	A124
	21	A125
	22	A126
	23	A127
	24	A128
	25	A129

SECTION VIII. INDEX-FIGURE AND ITEM NUMBER CROSS REFERENCE TO INDEX NUMBER (CONTINUED)

FIG. NO.	ITEM NO. OR REFERENCE DESIGNATION	INDEX NO.
18	26	A130
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	28	A132
	29	A133
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	34	A138
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	40	A144
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	42	A146
	43	A147
	44	A148
	45	A149
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	47	A151
	1	A152
	2	A153
	3	A154
	4	A155
	5	A156
	6	A157
	7	A158
	7A	A159
	8	A160
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	35	A184
	36	A185
	38	A186
	39	A187
	41	A188
	42	A189
	1	A190
	2	A192
	3	A193
	4	A194

FIG. NO.	ITEM NO. OR REFERENCE DESIGNATION	INDEX NO.
	5	A195
	6	A196
	7	A197
	8	A198
	9	A199
	10	A200
	11	A201
	12	A202
	13	A203
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	15	A206
	16	A207
	17	A208
	18	A209
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	21	A211
	22	A212
	23	A213
	24	A214
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	28	A218
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	61	A250
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	63	A252
	64	A253
	65	A254
	66	A255
21	1	A256
	2	A257
	3	A258
	4	A259

SECTION III. INDEX-FIGURE AND ITEM NUMBER CROSS REFERENCE TO INDEX NUMBER (CONTINUED)

FIG. NO.	ITEM NO. OR REFERENCE DESIGNATION	INDEX NO.
21	5	A260
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	14	A269
	15	A270
	16	A271
	17	A272
	18	A273
	19	A274
	20	A275
	21	A276
	22	A277
	23	A278
	24	A279
	25	A280
	25A	A281
	26	A282
	27	A283
	28	A284
	29	A285
	30	A286
	31	A287
	32	A288
	33	A289
	34	A290
	35	A291
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	38	A294
	39	A295
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	43	A299
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	70	A322
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	77	A329
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	84	A336
	85	A337
22	1	A338
	2	A339
	3	A340
	5	A341
	5A	A342
	6	A343
	7	A344
	8	A345
23	1	A346
	2	A347
	3	A348
	4	A349
	5	A350
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	26	A371
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	28	A373
	29	A374
	30	A375
	31	A376
	32	A377
	33	A378
24	1	A379
	2	A380
	3	A381
	4	A382
	5	A383
	6	A384
	7	A385
	8	A386

FIG. NO.	ITEM NO. OR REFERENCE DESIGNATION	INDEX NO.	FIG. NO.	ITEM NO. OR REFERENCE DESIGNATION	INDEX NO.
24	9	A387			
	10	A388			
	11	A389			
	12	A390			
	13	A391			
	14	A392			
	15	A393			

By Order of the Secretary of the Army:

W. C. WESTMORELAND,
General, United States Army,
Chief of Staff.

Official:

KENNETH G. WICKHAM,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

CNGB (1)
Dir of Trans (1)
CofEngrs (1)
TSG (1)
CofSptS (1)
ACSC–E (2)
USAMB (10) ✓37
USAARENBD (2) ✓35
UNCONARC (2)
USAMC (2)
USAMICOM (2)
USAECOM (2)
ARADCOM (2)
ARADCOM Rgn (1)
OS Maj Comd (2)
USACDCEC (10)
USASTRATCOM (2)
USAESC (70)
Armies (1)
SigFLDMS (1)
USASCS (60)
USASA (2)
USACDCCEA (1)
USACDCCEA
FT. Huachuca (1)
USAPA (10)
ARMY DEPOTS (1) except
LBAD (14)
SAAD (30)
TOAD (14)
LEAD (7)
NAAD (3)
SVAD (3)
ATAD (10)
Svc Colleges (1)
GENDEP (1)
Sig Sec GENDEP (4)
Sig Dep (6)
USACRREL (2)
Fort Huachuca (5)
WSMR (2)
Fort Carson (7)
USAERDAA (2)
USAERDAW (2)
Units org under fol TOE: (2 ea)
11–155
11–157
11–158
11–587
11–592
11–597
29–134

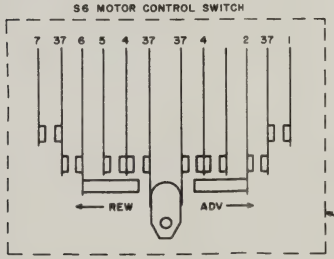
NG: None.

USAR: None.

For explanation of abbreviations used, see AR 320–50.

☆ U. S. GOVERNMENT PRINTING OFFICE: 1968—344438/27

SYM	PART NAME
M1	LOW SPEED MOTOR
M2	HI SPEED MOTOR
M3	TAKE UP MOTOR
M4	LAMP COOLING FAN MOTOR
M5	FILM COOLING FAN MOTOR
I1	PROJECTION LAMP
L1	VARIABLE REACTOR MOTOR CONTROL
T1	TRANSFORMER
T2	FILAMENT TRANSFORMER
L2	INTERLOCK SOLENOID
L3	CLUTCH SOLENOID
R1	TAKE UP MOTOR RESISTOR 200Ω, 50W (2)
R2	RECTIFIER CURRENT LIMITING RES 75Ω,5W
R3	CLUTCH SOLENOID RESISTOR 250Ω, 5W
R4	DISCHARGE RESISTOR 100Ω, 2W
R5	GRID RESISTOR 220K, .5W
R6	CONT CIRCUIT, CURRENT LIMITING RES. 2.7K, .5W
R7	LOW SPEED ADJUSTABLE POT. 50K, .5W
S1	INTERLOCK SOLENOID SWITCH
S2	MAGAZINE LOCATION SWITCH
S3	FILM TAB SWITCH
S4	MOTOR PROTECTION SWITCH
S6	MOTOR CONTROL SWITCH
RY1	FILM TAB SWITCH
RY2	MOTOR TRANSFER RELAY
RX1	CLUTCH RECTIFIER (4)
RX2	DISCHARGE RECTIFIER
C1	CLUTCH CAPACITOR 400UF, 250V
V1	THYRATRON TUBE (2050)
V2	THERMOSTATIC RELAY (6NO 15T)
S7	INTERLOCK SOLENOID HOLD SWITCH
C2	TAKE UP MOTOR CAPACITOR
RX3	TAKE UP MOTOR RECTIFIER
R8	CURRENT LIMITING RESISTOR 100Ω, 2W
R9	RESISTOR-ACCELERATION CONTROL 50Ω, 25W



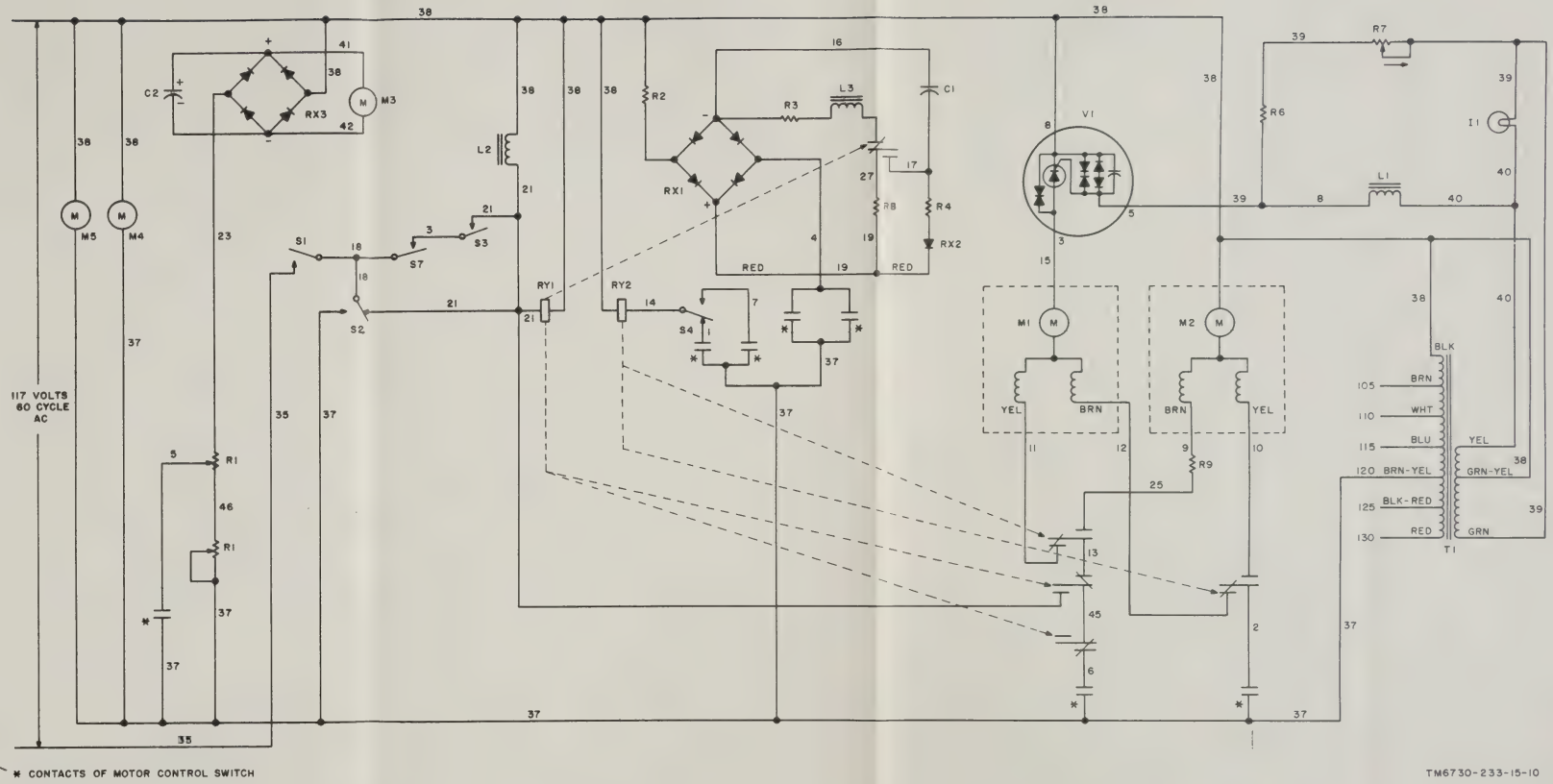


Figure 10. Circuit diagram.

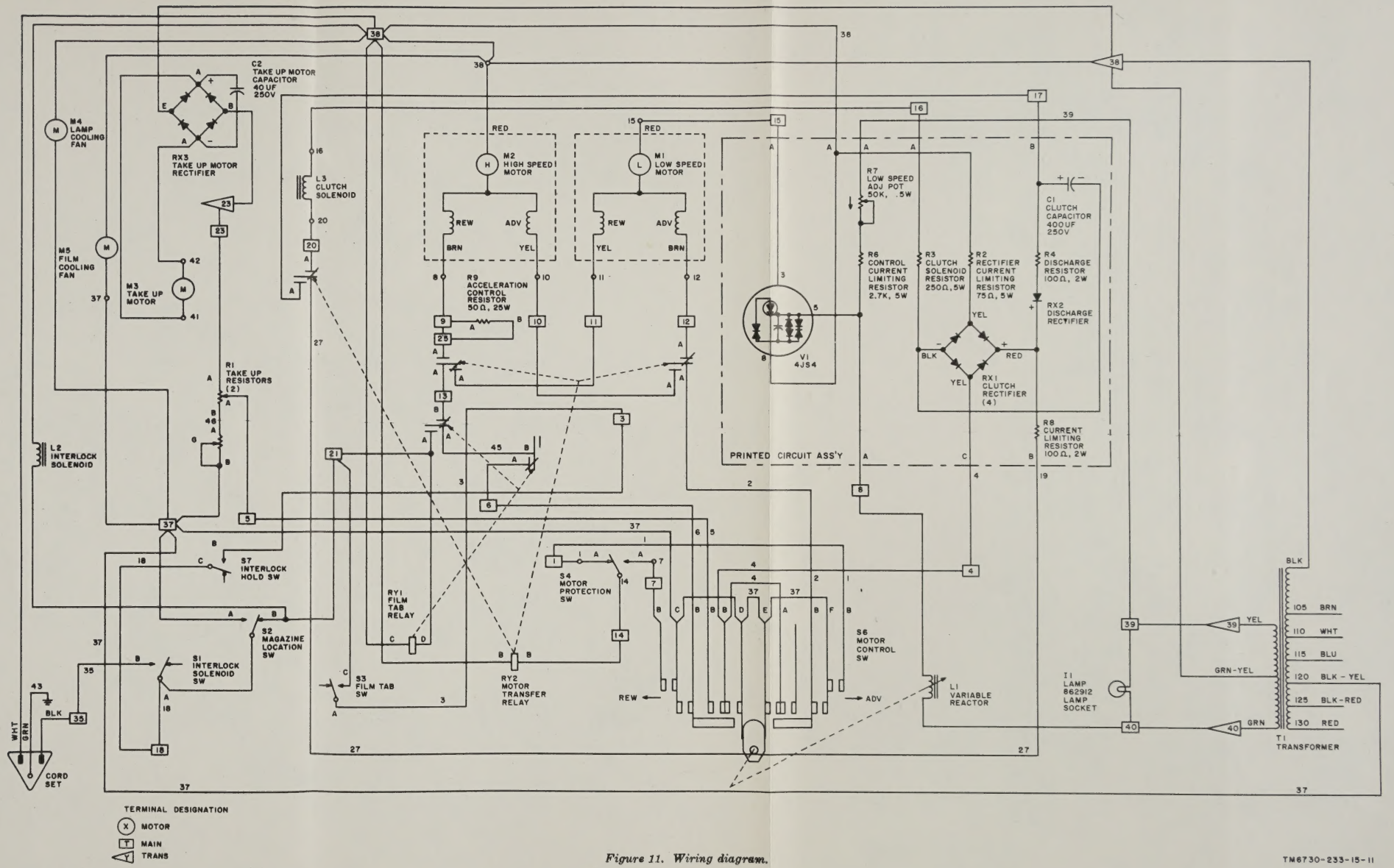


Figure 11. Wiring diagram.

TM6730-233-15-11